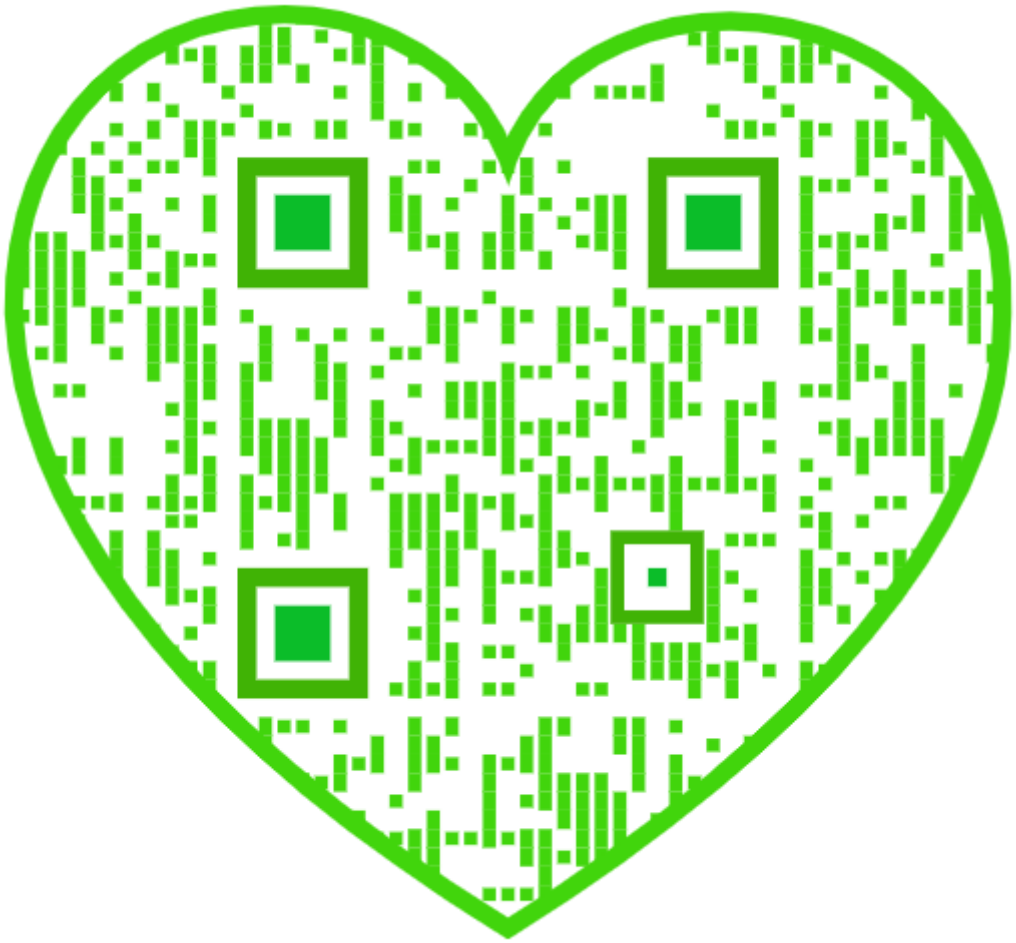

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THE LANDING OF WILLIAM PENN—1682

WINSTON'S
CUMULATIVE LOOSE-LEAF
ENCYCLOPEDIA
A COMPREHENSIVE REFERENCE WORK

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In Ten Volumes

ILLUSTRATED WITH PHOTOGRAPHS, MAPS, DRAWINGS AND COLOR PLATES; INCLUDING SEVEN COLOR PLATES FROM THE J. L. G. FERRIS COLLECTION OF AMERICAN HISTORICAL PAINTINGS, BY SPECIAL PERMISSION OF THE ARTIST

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P—10-22

KEY TO PRONUNCIATION

Three methods are used to indicate the pronunciation of the words forming the headings of the separate articles:

(1) By dividing the word into syllables, and indicating the syllable or syllables to be accented. This method is followed where the pronunciation is entirely obvious. Where accent marks are omitted, the omission indicates that all syllables are given substantially the same value.

(2) Where the pronunciation differs from the spelling, the word is re-spelled phonetically, in addition to the accentuation.

(3) Where the sound values of the vowels are not sufficiently indicated merely by an attempt at phonetic spelling, the following system of diacritical marks is additionally employed to approximate the proper sounds as closely as may be done:

ā, as in *fate*, or in *bare*.
ä, as in *alms*, Fr. *âme*, Ger. *Bahn*=ā of Indian names.
å, the same sound short or medium, as in Fr. *bal*, Ger. *Mann*.
a, as in *fat*.
ą, as in *fall*.
a, obscure, as in *rural*, similar to *u* in *but*, *ė* in *her*: common in Indian names.
ē, as in *me*=*i* in *machine*.
e, as in *met*.
ė, as in *her*.
ī, as in *pine*, or as *ei* in Ger. *Mein*.
i, as in *pin*, also used for the short sound corresponding to ē, as in French and Italian words.
eu, a long sound as in Fr. *jeûne*, = Ger. long *ö*, as in *Söhne*, *Göthe* (Goethe).
eu, corresponding sound short or medium, as in Fr. *peu*=Ger. *ö* short.
ō, as in *note*, *moan*.
o, as in *not*, *frog*—that is, short or medium.
ŏ, as in *move*, *two*.
ū, as in *tube*.
u, as in *tub*: similar to *ė* and also to *a*.
u, as in *bull*.
ü, as in Sc *abune*=Fr. *û* as in *dû*, Ger. *ü* long as in *grün*, *Bühne*.
u, the corresponding short or medium sound, as in Fr. *but*, Ger. *Müller*.
oi, as in *oil*.
ou, as in *pound*; or as *au* in Ger. *Haus*.

The consonants, b, d, f, h, j, k, l, m, n, ng, p, sh, t, v, and z, when printed in Roman type, are always given their common English values in the transliteration of foreign words. The letter c is indicated by s or k, as the case may be. For the remaining consonant sounds the following symbols are employed:

ch is always as in *rich*.
đ, nearly as *th* in *this* = Sp. *d* in *Madrid*, etc.
g is always hard, as in *go*.
ḥ represents the guttural in Scotch *loch*, Ger. *nach*, also other similar gutturals.
n, Fr. nasal *n* as in *bon*.
r represents both English *r*, and *r* in foreign words, in which it is generally much more strongly trilled.
s, always as in *so*.
th, as *th* in *thin*.
th, as *th* in *this*.
w always consonantal, as in *we*.
x = ks, which are used instead.
y always consonantal, as in *yea* (Fr. *ligne* would be re-written lēny).
zh, as *s* in *pleasure* = Fr. *j*.

WINSTON'S CUMULATIVE LOOSE-LEAF ENCYCLOPEDIA

VOLUME VII

Menelaus (men-e-lā'us), in Greek mythology, son of Atreus, brother of Agamemnon, and husband of the beauteous Helen, with whom he received the kingdom of Sparta or Lacedæmon. His wife having been abducted by Paris, son of Priam, king of Troy, he summoned the Greek princes to avenge the affront, and himself led sixty ships to the siege of Troy. After its conquest he returned with Helen to his native land in a devious voyage which led him to Cypria, Phœnicia, Egypt and Libya during a period of eight years.

Menelik II (men'e-lik), King of Abyssinia, was born in 1843, and succeeded John II in 1889. During his reign he defeated the Italian invaders of his country and welcomed civilizing influences. He died in 1913.

Menes (me'nēz), or MENA, according to Egyptian traditions, the first king of Egypt. See *Egypt*.

Mengs (mengz), ANTON RAFAEL, historical painter, born in 1728; died in 1779. He was the son of a Danish artist settled in Dresden, by whom he was trained in art, and taken to Rome, where he studied the works of Michael Angelo and Raphael. On his return to Dresden the king appointed him principal court painter. He painted also at Rome, and at the court of Charles III of Spain. In 1773 he executed at Rome the *Apotheosis of Trajan* in fresco, his finest work.

Menhaden (men-hā'den), an American salt-water fish (*Alōsa menhāden*). It belongs to the family Clupeidæ, or herrings. It yields quantities of oil, the refuse being used as manure. It is also preserved in the same way as the sardine. Menhaden fishing has done almost irreparable damage to all other kinds of fishing—especially the game food fishes along the Jersey coast—by depriving them of one of their chief supplies of food. It is carried on from Maine to Florida.

Meningitis (men-in-jī'tis), the term applied to inflammation of the two inner membranes (*meninges*) which envelop the brain—the *arachnoid membrane* and the *pia mater*. There are two forms of this disease, called *simple* and *tuberoular*. The former may be caused by injuries of the head, exposure to cold or heat, disease of the ear, etc., and the symptoms are pain in the head, giddiness, feverishness, and often vomiting; while the latter is frequently due to a scrofulous taint, and is also called *acute hydrocephalus*, or water in the head. Inflammation of the enveloping membranes of the spinal cord is called *spinal meningitis*.

Meniscus. See *Lens*.

Menno (men'ō), SIMONS, the founder of the sect known as the Mennonites, was born in Friesland in 1496; died in 1561. He was educated for the church and became a Roman Catholic priest; but about 1530 he joined the Anabaptists. After the suppression of the disturbances at Münster Menno collected the scattered remnants of the sect, inculcated in them more moderate views, and for many years in Holland and the north of Germany, as far as Livonia, labored to increase the number of his followers, and to disseminate his doctrines. There are a number of congregations in Holland, Germany and Russia. These do not believe in original sin, and object to taking oaths, making war, or going to law. The Mennonites in the United States number about 55,000.

Menobranchus (men-o-bran'kus), a genus of tailed amphibians, allied in structure to the eft or newt, found in lakes and streams of North America.

Menominee (mē-nom'o-nē), a city, county seat of Menominee County, Michigan, on Green Bay at the mouth of the Menominee River, at the extreme southwestern point of the Northern Peninsula. Menominee was at one time the largest lumber-shipping center in the world, but to-day it is supported largely by manufacturing, agricultural interests and wholesale business. Pop. (1920) 8907.

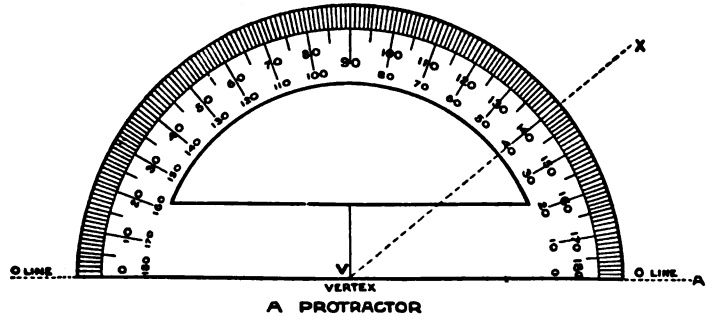
Menomonie (mē-nom'o-nē), a city, county seat of Dunn Co., Wisconsin, 25 miles W. by N. of Eau Claire, on Red Cedar River. Has brick yards, flour and barley mills, and a shipping trade in cattle, hogs, sheep and mill products. Pop. (1920) 5104.

Menopome (men'o-pōm), popularly known as the hellbender (*Cryptobranchus alleghaniensis*), a species of giant salamander of the order Batrachia. It is two feet long, ugly and harmless, and inhabits the rivers of the United States.

Menschikoff (men'shi-kof), ALEXANDER DANILOVITCH, a Russian minister, born at Moscow in 1672; died in 1729. He was born in humble life, but ultimately became a prince of the empire and first favorite with Peter the Great. When that monarch died his power, under Catherine I, was greatly increased. After two years she was succeeded by her grandson, Peter II, who came under the guardianship of Menschikoff, and to whom he endeavored to marry his daughter. His designs, however, were frustrated by the combined efforts of the Dolgorukis and the young czar, and Menschikoff was exiled to Siberia, where he died.—ALEXANDER SERGEIEVICH MENSCHIKOFF, great-grandson of the above, born in 1787; died in 1869; was both a general and a diplomatist, and in 1854 was made commander-in-chief during the Crimean war. He suffered defeat at the Alma and Inkerman; defended Sebastopol, but after its fall and the death of Nicholas he was recalled from the army, and died in retirement.

Menstruation (men-strō-a'shun), or MENSES, the periodical discharge of sanguineous fluid from the generative organs of the human female. The period at which menstruation begins is usually between the 14th and 16th year; it recurs at monthly intervals, lasting for four to six days, and thus continues until from the 45th to the 50th year. All these conditions, however, vary with each individual. A discontinuance of this discharge is one of the first signs of conception, and the cessation usually continues during the period of pregnancy and l ctation.

Mensuration (men-sū-rā'shun) is the practical application of the simpler processes of mathematics to the measurement of the area of a plane figure, or the volume of a solid, the result being expressed in square or cubic inches, feet, yards, etc. The area of any plane rectilineal figure is easily found, since it can always be divided into a certain number of triangles, and the area of every triangle is equal to the base multiplied by half the perpendicular height. If the figure is a parallelogram its area is equal to any side multiplied by the perpendicular distance from this side to the opposite; if a trapezium it is equal to half the sum of two opposite sides multiplied by the perpendicular distance between them. Circumference of a circle = diameter multiplied by 3.14159. Area of a circle = square of radius multiplied by 3.14159 = radius multiplied by half circumference. Volume of any rectangular solid = length, b r e a d t h and depth multiplied together.



A PROTRACTOR

The instrument commonly used for measuring angles and arcs is called a 'protractor' (see illustration). To measure an angle or arc place the vertex of the angle at the center of the protractor with one side of the angle running along the 0-line of the protractor; the reading where the other side of the angle falls is the number of degrees in the angle or arc. The angle AVX = 40° This is the simplest form of the protractor. In marine surveying a three-arm protractor is used, the middle arm being fixed with its reading edge at the zero of the scale; while the other arms, which pivot at the center of the instrument, are arranged to measure angles on each side of the middle arm.

Mental Defectives. Of late attempts have been made to classify mental defectives from the view-point of treatment, and possibility of cure or (at any rate) of amelioration of the condition. One of the most recent of these attempts is that of Barr and Maloney, and for educationalists, social workers, nurses, etc., it is the most serviceable which has yet appeared. Their classification is shown by the table on this page.

This table shows clearly the distinction between idiots, imbeciles, and the mentally feeble; at the same time it indicates what can be done in the way of treatment in the case of the two latter classes.

Recently the term '*moron*' has been introduced to denote a person who is mentally defective. The term is unnecessary, and also inexact; it does not clearly define any particular class, and gives no indication as to whether improvement is possible. The word is derived from the Greek *morós*, which means dull, or silly; and it is in no way superior to its English equivalent.

	IDIOT	
Asylum Care.	Profound — Apathetic / Excitable	Unimprovable.
	Superficial — Apathetic	Slightly improvable;
	Superficial — Excitable	Improvable in self-help only.
	IDIO-IMBECILE	
	Improvable in self-help and helpfulness. Trainable in very limited degree to assist others.	
	IMBECILE	
Long Apprenticeship and Colony Life under Protection.	Mentally deficient.	
	Low-grade—Trainable in industrial and simplest manual occupations.	
	Middle-grade—Trainable in manual arts and simplest mental requirements.	
	High-grade—Trainable in manual and intellectual arts.	
	MORAL-IMBECILE	
Custodial Life and Perpetual Guardianship.	Mentally and morally deficient.	
	Low-grade—Trainable in industrial occupations. Temperament bestial.	
	Middle-grade—Trainable in industrial and manual occupations. A plotter of mischief.	
	High-Grade—Trainable in manual and intellectual arts: with genius for evil.	
	BACKWARD or MENTALLY FEEBLE	
Trained for a Place in the World.	Mental processes normal, but slow and requiring special training and environment to prevent deterioration. Defect imminent under slightest provocation, such as excitement overstimulation or illness.	

Mental Hygiene, the science of adequate self-management. It has three definite objectives: (1) the development of the average and exceptional individual to his maximum social efficiency through attention to underlying factors in mental heredity, growth, and vigor, (2) the gradual elimination of feeble-mindedness and of mental and nervous diseases with their attendant social evils, and (3) the establishment and improvement of social and public agencies to bring about the realization of these aims.

Like the wider sciences of public health

and eugenics, Mental Hygiene denotes (a) a field of scientific research and (b) a definitely organized movement within the spheres of medicine, social service and education. The subject naturally embraces all the agencies that affect the mental well-being of man, and thus draws upon and contributes to (1) general hygiene, with its many roots, such as bacteriology, physiology, statistics, etc., and its branches, such as public health, school hygiene, etc., (2) the medico-psychological sciences—neurology, psychiatry, etc., and (3) psychology—clinical and educational. The main divisions of Mental Hygiene are (1) individual, (2) social, and (3) public.

Personal or Individual Mental Hygiene considers the interrelations (1) of mental and physical factors, *e. g.*, the influence of the thyroid and other glands upon mental development, the effect of fear, joy, and other emotions upon bodily health and fatigue, etc., (2) of aptitudes, limitations, etc., and vocational opportunities, *e. g.*, emotional attitudes as causes of success or failure, (3) of habits of work, recreation, and rest, *e. g.*, concentration and relaxation in the daily routine, and (4) of various mental processes, *e. g.*, the influence of unconscious processes, the effect of imagination on the will, etc. Individual Mental Hygiene is especially related to the work of educational agencies—schools, colleges, societies for disseminating health information, and to the personal work of physicians, nurses, and ministers. Courses in Mental Hygiene with special reference to personal problems are being introduced into colleges, normal schools, and high schools, and articles and leaflets are being prepared and disseminated.

Social Mental Hygiene includes a new branch of social medicine, known as social psychiatry, and a corresponding new division of social service, known as psychiatric social work. Psychiatric social workers assist psychiatrists in securing the social data, such as heredity, home conditions, etc., necessary in mental diagnosis, and in carrying out a program of supervision and assistance for mental outpatients. Problems especially within the field of Social Mental Hygiene are the study of the medico-psychological factors in social unrest, the diagnosis and treatment of the milder forms of mental disease and defect, *i. e.*, of those who are community problems rather than public charges, the reinforcement of campaigns against venereal diseases in their relation to mental disease, the dissemination of mental hygiene information, and the supplementing of facilities and initiation of improvements in the field of Public Mental Hygiene.

Public Mental Hygiene is concerned especially with the efficient administration of laws and of institutions dealing with mental and nervous cases that are public charges, either because of poverty or criminality. Among its special problems are development of curative and after-care methods so as to facilitate discharge; improved methods of admission and care through psychopathic hospital systems and custodial colonies; the establishment of institutional laboratories for research, the development of wholesome work for inmates both as a therapeutic and as an economic measure (see *Occupational Therapy*); the furthering of coöperation between all public departments that are confronted with mental hygiene problems —the departments of public health, public education, and public welfare with its subdivisions on prisons and corrections, child welfare, etc.

The earliest conceptions in Social and Public Mental Hygiene date back to the work of Pinel in France in 1792 and in America to the 'Mental Hygiene' of Switser in 1843, of Ray in 1863, and Gorton in 1873. Among the earliest contributions to Individual Mental Hygiene are essays of Dr. Benjamin Rush of the University of Pennsylvania, 'the father of American psychiatry,' published before 1800, 'the Dietetics of the Soul,' by a German physician, Dr. von Feuchtersleben, and 'The Hygiene of the Mind' by a Scotch physician, Dr. Clouston, whose work stimulated the interest of William James and others. Religious movements, bearing on phases of mental hygiene, such as the Emmanuel Movement within the Episcopal Church in America, Christian Science, and New Thought have been stimulated in part by the same conceptions, though the last two have developed along lines quite distinct from Mental Hygiene, which is fundamentally medico-psychological.

Mental Hygiene—public, social, and individual—has received its greatest impetus from the National Committee for Mental Hygiene, organized in 1909 in the United States as the result of special interest in the problem growing out of the publication of "The Mind That Found Itself," by Clifford Beers, who has been executive secretary of the committee since its inception. This committee has a medical director, Dr. Thomas W. Salmon, and several associate medical directors. State societies and committees affiliated with the national committee are conducting active and successful work in twenty states. In Connecticut, Massachusetts, New York, Pennsylvania, Maryland, Illinois and elsewhere, as in Canada, with its own national committee, the work of these

mental hygiene organizations is directed by executives who in most cases are psychiatrists devoting their whole time to this work. The work of these organizations has been largely supported by private citizens.

The attention of these mental hygiene committees and societies in their early days was chiefly directed to outstanding institutional and community needs. A number of surveys have been conducted throughout the country for the purpose of ascertaining the extent and kinds of facilities for the care and treatment of mental patients and of stimulating communities, legislatures and public executives to develop adequate facilities. Traveling exhibits, illustrated lectures, mental hygiene conferences at state and national conventions, and the dissemination of scientific articles are some of the chief educational methods employed.

As a result there have been marked improvements in standards and methods of dealing with mental patients, notably in the development of state hospital systems. Nevertheless even today there are counties and cities in the United States where conditions exist similar to those denounced by Pinel in 1792. One of the most recent developments in Public Mental Hygiene has been the establishment of well-organized state bureaus or commissions on Mental Hygiene. The proper identification, registration, and supervision of all mental patients, including the borderline or high grade feeble-minded and the psychopathic or semi-insane in the community, are among the problems confronting these state bureaus. The coöperation of the public schools through their departments of special classes is regarded as one of the big aids of the future in the solution of many of these problems.

Much pioneer work in the diagnosis, care, and educational treatment of the feeble-minded was done by the national Committee on Provision for the Feeble-minded (disbanded 1918). This was an extension of the work of the Training School at Vineland, N. J., under the leadership of Superintendent E. R. Johnstone and Dr. H. H. Goddard, formerly Director of the Research Department. Since 1918 this work has been continued in part by the Extension Department of the Training School, but a large measure of the activities have been carried on by the National Committee for Mental Hygiene and the affiliated state societies. The Committee on Provision took the initiative in work that led to the establishment of the Division of Psychology in the American Army in coöperation with the American Psychological Association, the National Research Council and the National Committee for Mental Hygiene.

The major activities of this latter committee during the World War were devoted to the mobilization of the psychiatrists of the country for service in the Neuro-psychiatric Division of Army. The medical director of the National Committee was sent to France with official charge of all the mental work in the expeditionary forces. Under his leadership unusual success was achieved at the front in the rehabilitation of shell-shock cases. The neuro-psychiatric work in the cantonments, including the responsibility for final action on all cases of mental incompetence, was under the immediate charge of the Associate Medical Director, then in charge of the office of the Neuro-psychiatric Division of the Surgeon General's Department. The marked achievements of Mental Hygiene during the war greatly stimulated interest and confidence in the work in this country and abroad.

Mentana (men-tä'nä), a village in Italy, province of Rome, near Tivoli, where Garibaldi met with a defeat in 1867.

Mentha (men'tha) the mint genus of plants. See *Mint*.

Menthol (men'thol), a white crystalline substance obtained from oil of peppermint, of which it smells strongly, used externally in case of nervous headache.

Mentone, in French MENTON (mäṇ-toṇ), a town in the French department Alpes-Maritimes, situated on the Mediterranean, divided into the old part, perched upon a steep hill, and the new quarter, along the shore. The climate is mild and equable, and the town has become a favorite winter health resort. Pop. (commune), 18,001.

Mentor (men'tor), the faithful friend of Ulysses, who entrusted to him the care of his domestic affairs during his absence in the war against Troy. The education of the young Telemachus fell to his charge and the wise and prudent counsel which he gave the youth has given to his name its metaphorical significance.

Menzaleh (men-zä'leh), a lake or lagoon in Egypt, running parallel with the Mediterranean, from which it is divided by a low-lying slip of land, from 2 to 12 miles in breadth. It receives the Pelusiac and Tantic branches of the Nile, and communicates with the sea by three openings. The Suez Canal runs along its eastern extremity.

Mephistopheles (me-fis-to f'e-lez), older forms, MEPHISTOPHILUS, MEPHISTOPHILIS, the

name of a demon in the old puppet-plays, adopted and developed by Marlowe in his tragical history of Dr. Faustus; and more especially by Goethe in the first part of Faust, where he becomes the cultured personification of evil rather than the Satan of popular belief.

Meppel (mep'el), a town of Holland, province of Drenthe, with manufactures of linen and cotton fabrics, etc. Pop. 10,470.

Mequinez (mek'i-nez), a city of Morocco, 35 miles w. of Fez. It is surrounded by a dilapidated wall, and contains a handsome palace, a summer residence of the emperors of Morocco.

Meran (me-rän'), a town of Austria in the Tyrol, on the Passer near its junction with the Adije, a favorite winter health resort. Pop. 9284.

Mercantile Agency. A system by which the financial standing of business firms is gauged as accurately as possible for the benefit of those with whom they deal. Quarterly commercial ratings of all houses of any standing in all lines of business are issued as a guide to those from whom they may seek credit. Special ratings are also furnished and these agencies are a sort of clearing house for credit in the business world.

Mercantile Law. See *Commercial Law.*

Mercator (mėr-kā'tur), GERARD, geographer, born at Rupelmonde, in Flanders, in 1512; died in 1594. He studied at Louvain; became a lecturer on geography and astronomy; entered into the service of Charles V, for whom he made a celestial and a terrestrial globe; and in 1559 he retired to Duisburg as cosmographer to the Duke of Juliers. He is the author of a method of projection called by his name (see next article), the principles of which were applied practically by Edward Wright in 1599. He is also the author of *Tabulæ Geographicæ* (Cologne, 1578).

Mercator's Projection, a method of projection used in map-making in which the meridians and parallels of latitude cut each other at right angles, and are both represented by straight lines. By means of this projection seamen are enabled to steer by compass in straight lines, and not in the spiral necessitated by the other projections.

Mercer (mer'ser), M. S., a Canadian army officer, commander of the 3d Canadian division in the European war, 1914-18. He was killed in action near Ypres in the European war (q. v.), June 2. 1916.

Mercia (mer'si-a), the largest of the Anglo-Saxon kingdoms, founded in 585; conquered by Egbert 827.

Mercier (mär'syā'), DESIRÉ, a Belgian cardinal (1851-), born near Waterloo. In 1907 he became Archbishop of Malines and was elevated to the cardinalate. During the German invasion of Belgium, 1914-18, he played a hero's part. He visited America in 1919.

Mercier, HONORÉ, a Canadian lawyer and statesman (1840--94) who wielded great influence in French Canada. He was premier of Quebec in 1887.

Mercury (mer'kū-ri), in mythology, the name of a Roman divinity, identified in later times with the Greek Hermēs. As representing Hermēs he was regarded as the son of Jupiter and Maia, and was looked upon as the god of eloquence, of commerce and of robbers. He was also the messenger, herald, and ambassador of Jupiter. As a Roman divinity he was merely the patron of commerce and gain. See *Hermēs.*

Mercury, in astronomy, the planet nearest the sun. It moves round the sun in 87.9693 of our mean solar days, at a mean distance of 35,392,000 miles; its eccentricity of orbit is 0.205618; the inclination of its orbit to the ecliptic is 70° 0′ 8.2″; its diameter about 3050 miles. The period of its axial rotation is unknown. Its volume is about $\frac{1}{17}$ that of the earth; its density $\frac{1}{10}$ greater than the earth's. It is visible to the naked eye in spring and autumn after sunset and before sunrise. Transits of mercury over the sun's disc take place at intervals of 13, 7, 10, 3, 10, 3, etc., years.

Mercury, called also quicksilver, a metal whose specific gravity is greater than that of any other metal, except platinum, gold and tungsten, being 13.56, or thirteen and a half times heavier than water. It is the only metal which is liquid at common temperatures. It freezes at a temperature of 39° or 40° below the zero of Fahrenheit, that is, at a temperature of 71° or 72° below the freezing point of water. Under a heat of 660° it rises in fumes, and is gradually converted into a red oxide. Mercury is used in barometers to ascertain the weight of the atmosphere, and in thermometers to determine the temperature of the air, for which purpose it is well adapted by its expansibility, and the extensive range between its freezing and boiling points. Preparations of this metal are among the most powerful poisons, and are extensively used as medicines. The preparation called calo-

mel or mercurous chloride ($HgCl$) is a most efficacious deobstruent. Another valuable preparation is corrosive or mercuric chloride ($HgCl_2$). From the fluid state in which mercury exists it readily combines with most of the metals, to which, if in sufficient quantity, it imparts a degree of fusibility or softness. An alloy of mercury and any other metal is termed an *amalgam*, amalgams being largely employed in the processes of silvering and gilding. Mercury is chiefly found in the state of sulphide, but it is also found native. The chief mines of mercury are in Spain, but it is also found in Germany, Italy, China, California, Borneo, Mexico and Peru.

Mercy, Sisters of, the name given to members of Roman Catholic religious communities of women, founded for the purpose of nursing the sick at their own homes, visiting prisoners, attending lying-in hospitals, superintending the education of females, and the performance of similar works of charity and mercy. Communities of Sisters of Mercy are now widely distributed over Europe and America. The Anglican Church also has an order of Sisters of Mercy.

Meredith (mèr'e-dith), George, poet and novelist, born in 1828 in Hampshire; educated in Germany; studied for the law, but essayed a literary career with a volume of poems in 1851. Among those that followed are the *Shaving of Shagpat* (1855); *The Ordeal of Richard Feverel* (1859); *Evan Harrington* (1861); *Poems and Ballads* (1862); *Rhoda Fleming* (1865); *The Egoist* (1879); *Diana of the Crossways* (1885); *One of Our Conquerors* (1891); *Lord Ormont and His Aminta* (1894), etc. He died in 1909.

Merganser (mèr-gan'sèr), a genus of aquatic birds belonging to the duck family. The goosander (*Mergus Merganser*) forms the typical European species; that of the North American continent is the hooded merganser (*M. cucullatus*). They inhabit lakes and the sea coast, migrate southward in winter, lay from eight to fourteen eggs, and are gregarious in habit.

Red-breasted Merganser (*Mergus serrator*).

Mergenthaler (mer'gen-tâ-lèr), Ottmar, inventor, born at Würtemburg, Germany, in 1854; died in 1899. He came to the United States in boyhood and experimented for years in the invention of a type-setting machine. In 1886 he completed the linotype machine, an invention which has revolutionized the art of the printer, and very greatly decreased the cost of printed matter.

Mergui (mer-gē'), the principal town of the district of same name in British Burmah, on an island in the delta of the Tenasserim River, close to where it falls into the Bay of Bengal. The harbor is good, and the modern town occupies a low range of hills rising from the river. Pop. 11,987.

Mergui Archipelago (mer-gē'), a chain of islands in the Indian Ocean, off the coast of Tenasserim and Lower Siam, the more northern ones forming a part of the British district of Mergui. The inhabitants are industrious, but few in number.

Merida (mer'i-dâ), a city of Spain, in the province and 30 miles east of Badajoz, on the right bank of the Guadiana, here spanned by a Roman bridge of eighty-one arches, built by Trajan. Other Roman remains are the arch of Santiago; the temple of Diana, now built into a dwelling-house; the theater, which is almost perfect; the amphitheater, the circus, the great aqueduct, etc. Merida was the capital of Lusitania for several centuries. Pop. (1910) 14,063.

Merida, the capital of Yucatan, in Mexico, is situated about 25 miles from the port of Progreso, on the Mexican Gulf, with which it is connected by a railway. It has a Moorish aspect generally, and contains a number of fine squares, a cathedral, bishop's palace, government house, etc. Merida was founded in 1542. It has various manufactures. Pop. (1910) 62,447.

Merida, a town of Venezuela, capital of a state of the same name, at the foot of the Sierra Nevada. It is a well-built place, with a university. Pop. of State, 115,537; of town, 13,366.

Meriden (mer'i-den), a city of New Haven Co., Connecticut, 18 miles N. E. of New Haven, on main line of New York, New Haven & Hartford R. R. Its principal industries include the manufacture of silverware, both sterling and plated; cutlery, castors, iron castings, cut glass, ball bearings, leather, portable lamps and fixtures, electrical ap-

paratus, etc. It has the State School for Boys, and Curtis Memorial Library. Pop. (1910) 32,066; (1920) 34,789.

Meridian (mẽr-id'i-an), one of the innumerable imaginary lines on the surface of the earth that may be conceived as passing through both poles and through any other given place, and serving to settle the longitude of places and thus to mark their exact position. There are also corresponding lines called *astronomical* or *celestial meridians*, which are imaginary circles of the celestial sphere passing through the poles of the heavens and the zenith of any place on the earth's surface. Every place on the globe has its meridian, and when the sun arrives at this line it is noon or mid-day, whence the name (Latin *meridianus—medius*, middle, and *dies*, day). The longitude of a place is its distance—usually stated in degrees, minutes and seconds—east or west of any meridian selected as a starting point, just as its latitude is the distance north or south of the equator. In Britain it has long been the custom to count from the meridian of Greenwich as a starting point; this meridian being called the first meridian, and the longitude of Greenwich being marked 0, or nothing. Other countries, however, had selected their own meridian, with the result that confusion arose among geographers and navigators in localizing any given place. This difficulty was discussed at a national conference held at Washington, October, 1884, and at last Greenwich was selected as the geographical and astronomical reference meridian of the world, longitude to be reckoned east and west from this up to 180°. It was also arranged that the astronomical day should begin at midnight, January 1, 1885.

Meridian (mer-id'i-an), capital of Lauderdale County, Mississippi, 96 miles E. of Jackson, is an important railroad terminus, and the principal manufacturing center of the state, with railroad repair shops, foundries and machine shops, and manufactures of furniture, cotton oil, fertilizers, sash, blinds, etc. Here is the East Mississippi Female College and other institutions. Pop. (1910) 23,285; (1920) 23,399.

Meridian Circle, a mural circle or transit circle.

Merimee (mā-rē-mā), PROSPER, a French poet and prose writer, born in 1803; died in 1870. He studied law and passed as advocate; but employed himself more with literature, and first came prominently forward in 1825 with eight comedies professedly translated from the Spanish of 'Clara Gasul.' He contributed to the *Revue de Paris* and the *Revue des Deux Mondes;* became inspector of historical monuments, in which capacity he traveled through France, and wrote several archæological works; continued to publish romantic tales, such as *Arsène Guillot, Carmen, Colomba*, etc.; was made a senator in 1853, grand officer of the Legion of Honor, 1866. Among his writings were *The History of Don Pedro I, of Castille* (1848); *Poetry of Modern Greece* (1855); *Lettres à une Inconnue* (1873); *Travels* in various parts of France, etc.

Merino (me-rē'nō), a twilled woolen tissue, dyed in various colors, and often also printed. In the better kind of goods both the warp and the woof are of carded woolen yarn, but in inferior sorts the warp is of cotton. The French fabrics are held in the highest estimation.

Merino Sheep, a variety of sheep originally peculiar to Spain, but now reared largely in other parts of Europe, in Australia, New Zealand, United States, etc. They are raised chiefly for the sake of their long fine wool, the mutton being but little esteemed.

Merioneth (mer-i-on'eth), or MERIONETHSHIRE, a maritime county in North Wales, bounded by Carnarvonshire, Denbighshire, Montgomeryshire, Cardiganshire, and by Cardigan Bay; area, 668 square miles. The coast line is broken and rugged; the surface of the county mountainous, the highest point being Aran Mowddwy (2970 feet). The principal minerals are lead, copper, and slates; in 1887 extensive gold-mining operations were begun in the Mawddach valley. The soil is for the most part poor, oats being the chief grain crop; cattle, sheep, and small hardy ponies are reared. Chief town, Dolgelly. Pop. (1911) 45,573.

Merivale (mẽr'i-vāl), CHARLES, an English historian, born about 1805; was educated at Harrow, Haileybury and Cambridge, where he had a distinguished career. He was rector of Lawford, Essex, 1848-69, then became dean of Ely. He wrote *History of Rome, Early Church History, Boyle Lectures*, etc. He died in 1893.—HERMAN MERIVALE, his brother (1805-1894), was professor of political economy at Oxford, and permanent under-secretary of State for India; author of *Historical Studies*, etc. —His son, HERMAN CHARLES (born in 1839; died in 1906), was an active writer of plays, poems, etc., some of his plays being, *All for Her, The White Pilgrim* and *Forget Me Not.*

Merle. See *Blackbird.*

Merle d'Aubigne (merl dō-bēn-yâ), JEAN HENRI, historian and theologian, born at Geneva, in 1794; died in 1872. His education, commenced at Geneva, was completed at Berlin. He became pastor at Hamburg to a French congregation; and removed afterwards to Brussels. Returning to his native city in 1830, he became professor of church history in the theological school founded by the Genevan Evangelical Society. Besides his well-known *History of the Reformation in the Sixteenth Century* (1835-53), he published a supplementary history to the time of Calvin (Paris, 1862-68); *The Protector* (Cromwell), 1847; and the *Recollections of a Swiss Minister.*

Merlin (mėr'lin), a legendary Welsh prophet and magician, who is claimed to have lived in the fifth century; to have been the offspring of a demon and a Welsh princess, and to have served as adviser to the English kings Vortigern, Ambrosius, Utherpendragon and Arthur. There was also a prophet connected with the ancient kingdom of Strathclyde called Merlin the Wild, or Merlinus Caledonius, who is said to have lived in the sixth century. His prophecies, containing also those ascribed to the Welsh Merlin, were published at Edinburgh in 1615.

Mermaid's-glove, a name given to the largest of British sponges (*Halichondria palmata*), from its tendency to branch into a form bearing a remote resemblance to a glove with extended fingers. It sometimes attains a height of 2 feet.

Meroe (mer'ō-ē), a city and State of ancient Ethiopia, in the northeastern part of Africa, corresponding mainly with the district between the Nile and Atbara, north of Abyssinia. Meroë was the center of the caravan trade between Ethiopia, Egypt, Arabia, Northern Africa and India. There are pyramids at the site of ancient Meroë and a small town of same name on the Nile.

Merops (mer'opz), the bee-eaters, a genus of birds forming the type of the family Meropidæ. See *Bee-eaters.*

Merovingians (mer-o-vin'ji-anz), the first dynasty of Frankish kings which ruled in the northern part of Gaul from 496 to 752, when they were supplanted by the Carlovingians.

Merrill, a city, county seat of Lincoln County, Wisconsin, on the Chicago, Milwaukee and St. Paul railroad. It is in a great timber district, and has large lumber boom and saw mills. Doors, sashes, blinds, shingles, etc., are manufactured. Pop. (1920) 8068.

Merrimac (mer'i-mak), a river of the United States in New Hampshire and Massachusetts. The immense water-power furnished by its falls has created the towns of Lowell and Lawrence in Massachusetts, and of Nashua and Manchester in New Hampshire.

Merrimac, the name of one of the earliest iron-clad warships, which took part in the memorable battle of the *Monitor* and *Merrimac*, in Hampton Roads in 1862. Originally a frigate of the United States navy, it was sunk in Norfolk harbor at the beginning of the Civil war, and subsequently raised by the Confederates and plated with bars of 3-inch cast-iron.

Merritt (mer'it), WESLEY, soldier, born in New York, in 1836; was graduated at West Point in 1860. He entered the Civil war, was a cavalry captain in 1862, and at Gettysburg commanded the Reserve Cavalry Brigade. In 1864 he commanded a division under Sheridan, being in every battle of that campaign. He served as superintendent of the United States Military Academy, 1882-87, was promoted major-general in 1895, and in 1898 was commander of the land forces in the Philippines, capturing Manila, August 13, with the aid of Admiral Dewey. He was retired on age limit in 1900, and died in 1910.

Mersey (mer'zi), an important river of England, has its origin in several streams which flow from the Pennine Moors and expands into an estuary 17 miles from its mouth at Runcorn, its entire length being 60 miles. The Manchester Ship Canal comprises part of the channel of the Mersey.

Merthyr-Tydvil (mer'ther tid'vil), or TYDFIL, a parliamentary borough of South Wales, county of Glamorgan, 24 miles N. N. W. of Cardiff, on the Taff. It has risen up from a mere village in 1780 to a place of great extent and importance, owing its prosperity to its situation near the center of the valuable coal and mineral field of South Wales. The shipping ports are Swansea and Cardic. Pop. 80,900.

Merv, an oasis in Central Asia, north of Afghanistan, the principal seat of the Teke-Turcomans, who from this center used to make predatory incursions into Persia and Afghanistan. In 1815 the oasis was subjugated by the Khan of Khiva, to whom it remained tributery for about twenty years. Sub-

sequently it was included in the Transcaspian province of Russia.

Mesa (mē'sa), an elevation with level surface, more especially a tableland of small extent rising abruptly from a surrounding plain; a term frequently used in that part of the United States bordering on Mexico.

Mesa Verde National Park, a United States government reservation in Colorado, of 48,966 acres, established in 1906. In addition to marvelous scenic beauties, the park includes many ruins of dwellings and other structures left by prehistoric peoples who had reached a high degree of civilization long before the discovery of America. The railroad gateway to the park is Moncos, Colorado. The main group of Cliff Dwellings is but ten miles southwest of Mancos by air line,

Mescal Button (*Lophophora Williamsii*).

Mescal - Buttons (mes-käl' but'nz). The dried tops of a succulent, spineless turnip-shaped cactus growing in the arid regions of Texas and Northern Mexico called locally *peyote, hikuli,* and *wokowi.* The plant rises but a short distance from the ground and has a flat top with a number of radiating convex ribs. The tops of the plants are collected by the Indians and dried, forming button-like masses about an inch in diameter and a quarter of an inch thick, which have narcotic properties. They are called *dry whisky* in Texas, and are either chewed dry or added to alcoholic drinks, producing a delirious intoxication somewhat resembling the effect of opium or of Indian hemp.

Mesembryan'themum. See *Ice-plant.*

Mesentery (mes'en-te-ri), a membrane in the cavity of the abdomen attached to the lumbar vertebræ posteriorly and to the intestines anteriorly. It is formed of a duplicature of the peritoneum, and contains adipose matter, lacteals, mesenteric glands, lymphatics and mesenteric arteries, veins and nerves. Its use is to retain the intestines in a proper position, to support vessels, etc.

Meshed (mesh-hed'), a town of northeastern Persia, capital of the province of Khorasan, 500 miles northeast of Ispahan. It contains the shrine of Imam Ruza, and is the sacred city of the great Mohammedan sect of the Shiites. The chief manufactures are velvets, sword blades, some silk and cotton goods, and turquoise jewelry. Its situation makes it an important entrepôt of trade. Pop. about 70,000.

Mesmer (mes'mer), FRIEDRICH ANTON, a German physician, founder of the doctrine of mesmerism or animal magnetism, was born in 1733; died in 1815. He professed to cure diseases by stroking with magnets, but about 1776 he renounced their use, and declared that his operations were conducted solely by means of the magnetism peculiar to animal bodies. (See *Mesmerism.*) He went to Paris in 1778, where he achieved considerable success and fame and made many converts to his views, but was regarded by the medical faculty as a charlatan. The government at length appointed a committee of physicians and members of the Academy of Sciences to investigate his pretensions. The report was unfavorable, and the system fell for the time into disrepute. Mesmer retired to Suabia, where he died.

Mesmerism (mes'mėr-izm), ANIMAL MAGNETISM (*electrobiology, hypnotism*), terms applied to certain peculiar nervous conditions which may be artificially induced, and in which the mind and body of one individual may be peculiarly influenced by another apparently independent of his own will. The term mesmerism is derived from Mesmer (see preceding article), who professed to produce these conditions in others and to cure diseases by the influence of a mysterious occult force residing in himself. This force he called animal magnetism. He held that it pervaded the whole universe, and specially affected the nervous system. The phenomena were known from the earliest stage, when the priests of most of the ancient civilizations affected to cure diseases by the touch of the hand, or threw people into deep sleeps, induced dreams, and produced many of the effects now referred to mesmerism. While the phenomena which Mesmer professed to produce were probably in many cases genuine, his theory of animal magnetism rested on no proper scientific basis. He has been followed by many disciples, whose success in producing the mesmeric condition has left no

doubt as to the reality of many of the phenomena of mesmerism; but modern scientific investigation, while not fully explaining all these, has shown that they are due to peculiar nervous conditions, and that it is unnecessary to presuppose any occult force to account for them. The means usually employed to produce the mesmeric condition are such as touching and stroking with the hands, according to rule (manipulation), breathing on the person, fixing the eyes on him, etc. It may also be produced by causing the patient to stare at an object, especially a bright one, placed in such a position as to strain the eye, the effect being completed by a few passes of the hand over the face without touching it. In the condition thus induced the patient seems to be in a kind of sleep. The limbs will remain in any position in which they may be placed. By stroking the surface of the body the muscles adjacent may be rendered rigid as in a person suffering from catalepsy. Reason and memory are temporarily suspended, the will is paralyzed and the subject is irresistibly impelled to act in accordance with suggestion, however absurd. He can be persuaded into any hallucination, such as that he is someone other than himself, or that he hears or sees, smells or tastes something which has no existence before him. As a therapeutic agent mesmerism has been successfully employed in diseases that have a nervous origin.

Many theories similar to that of Mesmer have been propounded to account for these phenomena, *e. g.*, that of the Baron von Reichenbach of the existence of an 'influence' developed by certain crystals, the human body, etc., existing throughout the universe, which he called *odyl*; that of electro-biology, which attributes them to electric currents of spiritualism and clairvoyance, which attribute them to spiritual influences. The first step towards scientific investigation of them was taken by James Braid, a surgeon in Manchester, who attempted a physiological explanation of them in a paper read before the British Association at Manchester in 1842, and in a work published in 1843 entitled *Neurypnology*. To him we owe the term hypnotism (Greek *hypnos*, sleep). Scientific investigation has since been devoted to the subject to a considerable extent, and much has been learned concerning it. The phenomena seem in many cases to be a result of suggestion, the ideas implanted in the minds of those under its influence being remarkably persistent, even when very inconsistent with the normal thoughts. The study of mesmerism is still being actively prosecuted.

Mesne (mēn), in law, middle or intervening. *Mesne process* is defined by Wharton as 'all those writs which intervene in the progress of a suit or action between its beginning and end, as contradistinguished from primary and final process.'

Mesopotamia (mes-ō-pō'tā-mī-a), a name given by the Greeks to the extensive region inclosed by the Tigris and Euphrates, anciently associated with the Assyrian and Babylonian monarchies, and densely peopled. Its Old Testament name is *Aram Naharaim*, or *Padan Aram*. The Greek title was probably not in use until after Alexander the Great invaded the East. This country is inhabited chiefly by Arabs, Kurds and Armenians, its population having very greatly decreased. Many of them are nomadic, and their chief occupation is the grazing of cattle. Mesopotamia is not a political division. The country is nominally divided among several Turkish villayets, though the tribes retain their independence. The region was included in the great German plan of a Middle Europe, which would stretch from the North Sea to the Persian Gulf. The Berlin-to-Bagdad railway was well on the way toward completion when the war broke out (1914), and an attempt was made to rally the Arab tribes to the support of the Teuton-Turkish cause. The capture of a British expeditionary force at Kut-el-Amara (*q. v.*) in 1915 was a hard blow to British prestige in the near East, but the status of the great empire was regained with the successful Mesopotamian expedition undertaken later by Sir Stanley Maude with Indo-British troops. Kut-el-Amara fell on February 25, 1917, and Bagdad on March 11.

Mesothorium (mes-ō-thō'ri-um), a disintegration product of thorium, intermediate between thorium and radiothorium. Mesothorium differs from radium chiefly in a more rapid loss of power. Whereas it has been calculated that it would need 1800 years before the energy of a gramme of radium be reduced by one-half, mesothorium retains its full energy only for the first few years. After this the force is gradually dissipated. Mesothorium has been used in the treatment of cancer.

Mesothorax (mes-ō-thor'aks), in entomology, the middle rising of the thorax.

Mesozoic Period (mes-ō-zō'ik; from Gr. *mesos*, middle, and *zoē*, *life*), the term applied by geologists to the geological period between the Palæozoic and the Cænozoic. It is coextensive with the secondary for-

mations, and includes the rocks of the Triassic, Oölitic and Cretaceous groups.

Mespilus (mes'pi-lus), the medlar, a genus of trees.

Mesquite (mes'kit; *Prosōpis glandulōsa*), a small tree allied to the acacia, common in Mexico, Texas, and other parts of western North America. It yields a gum not much inferior to gum arabic; its seeds are eaten, and a drink is prepared from the mucilage of its pods. Another species (*P. pubescens*) has pods that are eaten by the Indians, being rich in saccharine matter. They are of a twisted form, hence the name 'screw bean.'

Mess, in sea language, denotes a particular company of the officers or crew of a ship, who eat, drink and associate together; in military language, a sort of military ordinary, established and regulated by the rules of the service, for all the officers in a regiment, and supported by their joint subscriptions, supplemented by a small government allowance. Similar institutions are extended to the non-commissioned officers of a regiment, but the technical meaning of messing as applied to officers does not hold with regard to common seamen and soldiers.

Messalina (mes-a-lē'na), VALERIA, the third wife of the Roman emperor Claudius. She is notorious in history on account of her licentiousness and cruelty. She was murdered A.D. 48.

Messa'na. See *Messina.*

Messenia (mes-sē'ni-a), a country of ancient Greece, in the southern part of the Peloponnesus. Its capital was Messēnē, with the mountain fortress Ithōmē. On its southern coast lay the Messenian Gulf (now the Gulf of Coron); a ridge of Mount Taygētus separated it from Sparta. Messenia is celebrated for the long struggle of its inhabitants in defense of their liberty with the Lacedæmonians, with whom they waged three wars, the first extending from 743-724 B.C., the second from 685-668 B.C., and the third from 464-456 B.C. —Messenia gives name to a monarchy in modern Greece, with an area of 1221 square miles.

Messiah (me-sī'a; Greek form, *Messias;* Hebrew, *Mashiach*), corresponding to the Greek *Christos* of the New Testament, that is, 'anointed,' has in the Old Testament several applications, as to the whole Jewish people, to the priests, to the kings ('the Lord's Anointed'), and even to Gentile kings, as persons who had been anointed with holy oil. The designation, however, owes its special importance to the application of it in the prophetic books of the Old Testament to an ideal holy king and deliverer whose advent they foretold. The whole of the prophetic pictures agreed in placing Jehovah in the central place of the desired kingship. These prophecies, which are called the Messianic prophecies, had at the time of our Lord come to be applied by the Jews to a temporal king who should free them from foreign oppression. They are affirmed by Jesus Christ and His apostles to apply to and be fulfilled in him; and this is the belief of the Christian Church, by which he is called 'The Messiah.' The rationalistic school of theologians assert that Jesus laid claim to the dignity either to meet the preconceptions of his countrymen, or because he felt that the truth which he taught was the real kingdom never to be destroyed which the God of Heaven was to set up.

Messina (mes-sē'na; ancient Greek name, *Zanklē;* Latin, *Messāna*), the chief commercial town and seaport of Sicily, capital of the province and on the strait of the same name. The harbor is one of the best in the Mediterranean. The manufactures consist chiefly of silk goods. The principal exports are silks, olive oil, oranges, lemons, and other fruits; wine, salted fish, lemon juice, essences, etc. Often visited by earthquakes, and more than once ruined, it was utterly destroyed in December, 1908, with a great part of its population of 150,000, by one of great violence, which destroyed also the city of Reggio and many towns. It has since been restored. Pop. 126,577.

Messina, STRAIT OF, the strait which separates Sicily from Italy. It has a length of about 20 miles, and varies in width from 2 miles in the north to 11 miles in the south, is very deep, and has a strong tidal current.

Messines Ridge, BATTLE OF. During the greater part of three years in which the British defenders held the Ypres region against all the efforts of the German forces, an elevation overlooking this city and the British trenches in its vicinity, the Wytschæte-Messines Ridge, lay under Teuton control, while from it they harassed their enemies with severe gunfire. For their own protection they had constructed an elaborate system of trenches, dugouts and wire-entanglements which they looked upon as impregnable. But there was a means of reaching them at a vital point, one which they had not taken into serious consideration, but for which General Haig had been diligently preparing during the early months of

1917. The method designed was one of deeply excavated mines, the use of armored 'tanks,' and one of the largest arrays of artillery gathered at any one point during the war. By the 1st of June all was ready and during the following week an intense fire from these guns, light and heavy alike, was poured on the heights and on the lines of communication in the rear. At the same time a fleet of airplanes hovered over the German lines, driving back the air patrols of the foe and advising the gunners of every movement of the enemy squadrons. All this meant to the German commanders the launching of a powerful assault, and reinforcements were hurried to the front through the blasting fire of the British batteries. The defenders already on the ridge were pinned to their trenches and dugouts, death hovering in the outer air.

But this was only the visible and audible portion of the British assault. For two years sapping and mining operations had been diligently pursued, burrowing under the ridge and constructing mines which now held more than 1,000,000 pounds of explosive ammunition. This work reached its final completion on the night of June 6, when the electrical engineers were ready to fire the volcanic mines that had been so long in preparation. The night in question began with a severe thunder storm in which the artillery of the heavens vied with that of the earth. When the storm had passed, the reserve force of men, guns and 'tanks' moved forward to the battle zone, and by 3 A. M. of the 7th all was ready for the terrific explosion. We may quote the words of Philip Gibbs, a newspaper correspondent:

'Out of the dark ridges of Messines and Wytschaete, the ill-famed Hill 60, there gushed up enormous volumes of scarlet flame from exploding mines, and of earth and smoke, all lighted by flames spilling over into fountains of fierce color, so that the countryside was illuminated by the red lights. The earth trembled and quaked, the British soldiers waiting to rush the first line trenches were rocked up and down, this way and that, as if in an open boat on a rough sea.'

So great was the roar of this gigantic explosion that it was heard by Lloyd George at his country home in England, 140 miles away. It leveled hills, Hill 60 being obliterated. It tore trenches into shapeless hollows, leveled the wire entanglements, and blew the defenders high into the air or buried them under tons of earth. Never in the history of war had this volcanic explosion been equalled. Its roar had hardly subsided when the guns opened with the most intense shell-fire of the whole war. The infantry darted forward under this fearful barrage with fixed bayonets, and in a few minutes the whole front line of trenches was in their hands. Of the dead Germans only a few were to be found. Most of them were buried in the huge grave excavated for them, a yawning chasm one hundred yards wide and sixty feet deep.

With the winning of the first line trenches ended the opening phase of the affair. The peak of the ridge had yet to be stormed, but in less than three hours the whole section south of Ypres, extending to a considerable width, was in British hands and the position was being rapidly consolidated into a new battle-line of the Allies. Following this came the third and final stage of the stupendous assault. The guns, which had so long fronted the ridge, were now hurried forward to the high ground now held by the infantry, the drivers urging their horses up the slopes, passing through the lines of cheering soldiers, to begin the assault of the rear defenses still in German hands. A strong resistance was here encountered, but by nightfall the victory was complete, and the whole rear position, extending along a front of five miles and to a depth of three miles, was occupied and strongly held by the victorious columns. So paralyzing was the tremendous blow that forty hours passed before the Germans were able to launch a counter-attack—one that completely failed. So well had the affair been managed that the loss of the victors was small as compared with the magnitude of their triumph. The killed and wounded numbered 10,000, of whom 7000 had light casualties. The German loss was estimated at 30,000, of whom 7000 were prisoners. How many lay entombed in the great grave that had been excavated was not possible to estimate.

Messuage (mes'wij), in law, is the term used for a dwelling house with a piece of land attaching, as garden, orchard, etc., and all other conveniences, as out-buildings, etc., belonging to it. The term is derived from the French *mesuage*.

Mestizos (mes-tē'zōs), people of mixed origin in countries where Spanish Europeans have settled and intermingled with the natives.

Meta (mā'ta), a great river of South America, a tributary of the Orinoco, which it joins in Venezuela, though the greater part of its course is in Colombia; length 700 miles.

Metabola (me-tab'o-la; Greek, *metabolē*, change), a term applied to insects that undergo metamorphosis.

Metabolism (me-tab'ol-izm). This term is used in biology to sum up the changes which take place within the body, or in a body cell, by which the food is changed into living tissue, and on the other hand, the tissues are disorganized and prepared to be expelled from the body. Thus it signifies the sum of the constructive and destructive processes. In theology, it has to do with the change of bread and wine in the eucharist. In poetry, it signifies a change from one meter to another.

Metacarpus (met-a-kar'pus), in anatomy, the part of the hand between the wrist and the fingers. See *Hand.*

Metacenter (met-a-sen'tėr), in physics, that point in a floating body in which, when the body is disturbed from the position of equilibrium, the vertical line passing through the center of gravity of the fluid displaced (regarded as still filling the place occupied by the body) meets the line which, when the body is at rest, passes through the center of gravity of the fluid and that of the body. In order that the body may float with stability the position of the metacenter must be above that of the center of gravity.

Metagen'esis. See *Generation* (*Alternate*).

Metalloid (met'a-loid), in chemistry, a term applied to all the non-metallic elementary substances. The principal metalloids include oxygen, hydrogen, nitrogen, carbon, chlorine, bromine, iodine, fluorine, sulphur, selenium, phosphorus, boron and silicon.

Metallurgy (met'al-ėr-ji), the art of working metals, comprehending the whole process of separating them from other matters in the ore, smelting, refining, etc.

Metals (met'alz). Elementary substances have been divided by chemists into two classes, *metals* and *non-metals* or *metalloids*, but these merge one into the other by gradations so imperceptible that it is impossible to frame a definition which will not either include some non-metallic bodies or exclude some metallic. The term metal is an ideal type, and is applied to those elementary substances which in the combination of physical characteristics which they present approach more or less nearly to it. The following are the chief characteristics of metals. They are opaque, having a peculiar luster connected with their capacity called *metallic;* insoluble in water; solid, except in one instance, at ordinary temperatures; generally fusible by heat; good conductors of heat and electricity; capable, when in the state of an oxide, of uniting with acids and forming salts; and having the property, when their compounds are submitted to electrolysis, of generally appearing at the negative pole of the battery. Many of the metals are also malleable, or susceptible of being beaten or rolled out into sheets or leaves, and some of them are extremely ductile, or capable of being drawn out into wires of great fineness. They are sometimes found native or pure, but more generally combined with oxygen, sulphur, and some other elements, constituting *ores.* The great difference in the malleability of the metals gave rise to the old distinction of *metals* and *semimetals*, which is now disregarded. The following—fifty-two in number—are the elementary substances usually regarded as metals:—aluminium, antimony, barium, beryllium or glucinum, bismuth, cadmium, cæsium, calcium, cerium, chromium, cobalt, columbium or niobium, copper, didymium, erbium, gallium, germanium, gold, indium, iridium, iron, lanthanum, lead, lithium, magnesium, manganese, mercury, molybdenum, nickel, osmium, palladium, platinum, potassium, rhodium, rubidium, ruthenium, scandium, silver, sodium, strontium, tantalum, tellurium, terbium, thallium, thorium, tin, titanium, tungsten, uranium, vanadium, yttrium, zinc, zirconium. Of these gold, silver, copper, tin, lead, zinc, platinum, iron, are the most malleable—gold, which possesses the quality in the greatest degree, being capable of being beaten into leaves $\frac{1}{10000}$ of a millimeter in thickness. The following, given in the order of their ductility, are the most ductile:—platinum, silver, iron, copper, gold, aluminium, zinc, tin, lead, platinum wire having been obtained of not more than $\frac{1}{1200}$ of a millimeter in diameter. The majority of the useful metals are between seven and eight times heavier than an equal bulk of water; platinum, osmium and iridium are more than twenty times heavier; while lithium, potassium and sodium are lighter. The metals become liquid, or otherwise change their condition, at very various temperatures: platinum is hardly fusible at the highest temperature of a furnace; iron melts at a little lower temperature; and silver somewhat lower still; while potassium melts below the boiling-point of water, and becomes vapor at a red heat, and it and sodium may be molded like wax at 16° C. (61° Fahr.). Mercury is liquid at ordinary temperatures, and freezes only at 39½° C. below zero (—39° Fahr.). Osmium and tellurium are also regarded by some as non-metals. All the metals, without exception, combine with oxygen,

sulphur and chlorine, forming *oxides*, *sulphides* and *chlorides*, and many of them also combine with bromine, iodine and fluorine. Several of the later discovered metals exist in exceedingly minute quantities, and were detected only by spectrum analysis, and there is every likelihood that research in this direction will add to the present list of metals.

Metamerism (me-ta'mĕr-izm), in chemistry, the character in certain compound bodies differing in chemical properties, of having the same chemical elements combined in the same proportion and with the same molecular weight; thus, aldehyde (C_2H_4O) and oxide of ethylene (C_2H_4O) have their elements in the same proportion and the same molecular weight, 44. Metameric bodies do not, however, belong to the same class or series of compounds. See *Isomerism*, *Polymerism*.

Metamorphic Rocks (met-a-mor fik), in geology, stratified or unstratified rocks of any age whose original texture has been altered and rendered less or more crystalline by subterranean heat, pressure, or chemical agency. The name is given more especially to the lowest and azoic, or nonfossiliferous, stratified rocks, consisting of crystalline schists, and embracing granitoid schist, gneiss, quartz-rock, mica-schist and clay-slate, most of which were originally deposited from water and crystallized by subsequent agencies. They exhibit for the most part cleavage, crumpling and foliation, and their lines of stratification are often indistinct or obliterated.

Metamorphosis (met-a-mor'fō-sis), any change of form, shape, or structure. In ancient mythology the term is applied to the transformations of human beings into inanimate objects, with which ancient fable abounds. In zoology it includes the alterations which an animal undergoes after its exclusion from the egg or ovum, and which alter extensively the general form and life of the individual. All the changes which are undergone by a butterfly in passing from the fecundated ovum to the imago, or perfect insect, constitute its *development*—each change, from ovum to larva, from larva to pupa, and from pupa to imago, constituting a *metamorphosis*. Insects which undergo a complete metamorphosis are known as *Heteromorphous* or *Holometabolic* insects. Others, such as the grasshoppers, locusts, bugs, dragon flies, etc., undergo a less perfect series of changes, and are termed *Hemimetabolic* or *Homomorphous* insects. The occurrence of metamorphosis is by no means confined to the lowest groups of the animal series, for we find the amphibian vertebrates—as in the case of frogs, newts, and their allies—exemplifying these phenomena in a very striking manner. The metamorphoses of the Annulosa, however, including the insects, crustaceans, worms, etc., are among the most marked and familiar with which we are acquainted.

Metaphor (met'a-fur), a figure of speech founded on the real or ideal resemblance which one object is supposed to bear, in some respect, to another, and by which a word is transferred from an object to which it properly belongs to another in such a manner that a comparison is implied, though not formally expressed. It may be called a simile without any word expressing comparison. Thus, 'that man is a fox,' is a metaphor, but 'that man is like a fox,' is a simile. So we say, a man *bridles* his anger; beauty *awakens* love or tender passions; opposition *fires* courage.

Metaphysics (met-a-fiz'iks; Gr. *meta*, after, and *physica*, physics), a word first applied to a certain group of the philosophical dissertations of Aristotle which were placed in a collection of his manuscripts after his treatise on physics. As since employed, it has had various significations, and recently it has been understood as applying to the science which investigates the ultimate principles that underlie and are presupposed in all being and knowledge. In the part of the Aristotelian treatise alluded to the problems were concerned with the contemplation of being as being, and the attributes which belong to it as such. This implies that things in general must be divided into beings or things as they are, and into phenomena or things as they appear. In modern usage metaphysics is very frequently held as applying to the former division, that is, to the ultimate grounds of being. To attain this end it takes into account the correlative of being, that is, knowledge; and of knowledge not as coming within the province of logic or of mental philosophy, but as it is in relation to being or objective reality. In this respect metaphysics is synonymous with ontology. The science has also been considered as synonymous with psychology, and to denote that branch of philosophy which investigates the faculties, operations, and laws of the human mind.

Metastasio (mā-tâs-tâs'i-o), Pietro Buonaventura, an Italian poet, born at Assisi in 1698; died at Vienna in 1782. His true name was Trapassi, and his father was a common

workman. His poetical talents were early displayed in making rhymes and in improvisations. The lawyer Gravina, who accidentally became acquainted with his talents, took him under his protection, called him (by an Italianized translation of his name into Greek) *Metastasio*, paid great attention to his education, and on his death, in 1717, left him his whole estate. Two years afterwards, having spent his fortune, he entered a lawyer's office in Naples. There in 1722 he wrote a serenade for the birthday of the empress which brought him the favor of the Roman prima donna, Marianna Bulgarelli, called *La Romanina*. He resided with La Romanina and her husband in Rome till 1729, and during that time produced many operas, commencing with the *Didone Abbandonata* in 1724. His success was such that Charles VI invited him to Vienna in 1729, and appointed him poet laureate with a pension of 4000 guilders. Metastasio may be said to be the father of the modern Italian opera. His works, while not possessing the highest literary merit, were eminently fitted for musical effect.

Metatarsus (met-a-tar'sus), the part of the foot popularly known as the 'instep.' See *Foot*.

Metauro (me-tą'rō; anciently *Metaurus*), a river of Italy, in the Marches, which after a E. N. E. course of about 50 miles falls into the Adriatic. On its banks Hasdrubal was defeated and slain by the Romans (207 B. C.)

Metayer (me-tā'yėr), a cultivator who tills the soil for a landowner on condition of receiving a share, generally a half of its produce. The *metayer system* is practiced chiefly in France and Italy, though 'farming on halves' is common in the United States.

Metazoa (met-a-zō'a), one of the two great sections into which Huxley divides the animal kingdom, the other being the Protozoa. The lowest of the Metazoa are the Porifera or sponges. That portion of the Metazoa which possess a notochord constitute the subkingdom Vertebrata; the rest are invertebrate.

Metchnikoff (mech'ni-kof), ELIAS, a Russian zoologist, born in Kharkoff gov. in 1841: became a professor at Odessa in 1870, and later head of the bacteriologic station. In 1890 he took up work in the Pasteur Institute, Paris, and upon Pasteur's death in 1895 became director. His theories with regard to the prolongation of life have attracted universal attention. Died in 1916.

Metcalf (met'kaf), VICTOR HOWARD, statesman, was born at Utica, New York, in 1853. He studied in Yale Law School, and practiced law at Oakland, California, from which State he was thrice elected to Congress (1899-1904). He served in President Roosevelt's cabinet, 1904-06, as Secretary of Commerce and Labor, and 1906-08, as Secretary of the Navy.

Metempsychosis (me-temp-si-kō'-sis), transmigration; the passage of the soul from one body to another. See *Transmigration of the Soul*.

Meteor (mē'te-ur), a name originally given to any atmospheric phenomenon; it is now more usually applied to the phenomena known as shooting stars, falling stars, fireballs or bolides, aerolites, meteorolites, meteoric stones, etc. It is now generally believed that these phenomena are all of the same nature, and are due to the existence of a great number of bodies, many of them very small indeed, revolving round the sun, which, when they happen to pass through the earth's atmosphere, are heated by friction and become luminous. Under certain circumstances portions of these bodies reach the earth's surface, and these are known as meteorites or meteoric stones. These stones consist of known chemical elements. They have this peculiarity, that whereas native iron is extremely rare among terrestrial minerals it usually forms a component part, and frequently the whole, of meteorites, and is known as meteoric iron. Exceptionally large showers of meteors appear in August and November every year, and the November showers exhibit a maximum brilliancy every 33 years. As to the connection of meteors with comets see *Comets*.

Meteoric Iron. See *Iron (Native)*, and *Meteor*.

Meteoric Stones. See *Meteor*.

Meteorology (mē-te-or-ol'o-ji), the science or branch of knowledge that treats of atmospheric phenomena relating to weather and climate. The phenomena with which it deals and the instruments used in their observation are mainly these, viz.; temperature (thermometer), humidity (hygrometer), (anemometer), rainfall (rain-gauge), and atmospheric pressure (barometer), wind clouds. These phenomena are all referable to the action of the sun, and accordingly present variations depending upon locality (including the infinitely varied physical features of different places), the diurnal revolution of the earth upon its axis, and the annual revolution of the earth round the sun. It is the business

of meteorology to examine the laws which regulate these variations. It pursues its inquiries in two directions, (1) with reference to the variations observed at different times in the same locality with the view of obtaining average results as to its climate—climatology, and (2) with reference to the variations observed in different localities at the same time with the view of arriving at the laws which regulate the changes in the weather—weather study. In the prosecution of this study observations are taken at the same hour of Greenwich time at a number of stations situated over a large extent of the earth's surface. These observations include readings of barometer, thermometer, hygrometer, rain-gauge, anemometer, etc., with non-instrumental observation of clouds. The results which indicate the phenomena existing at that hour at the several stations are tabulated, or registered, formed into weather charts, etc. These charts are made by putting down on a map readings taken at the same moment over a large tract of country, and joining by lines the points where the readings agree. Since the general use of the electric telegraph this branch has assumed great practical importance. By its means observations made at many distant places may be immediately communicated to one center, and men of science are thus enabled to forecast with considerable accuracy the weather which may be expected in certain districts. Such forecasts can be made with great accuracy in tropical and subtropical countries where the atmospheric conditions are very constant, and variations from the average are consequently easily observed. They are attended with much more difficulty in temperate countries. In the United States, where the majority of storms rise in the district to the west of the Mississippi, and are thus capable of easy observation, great accuracy has been attained. The Weather Bureau originated in 1870, as an attachment to the Signal Service Office of the War Department. In 1891 it was transferred by law to the Department of Agriculture, its functions being closely allied to that interest. Its predictions of the coming weather (now termed 'forecasts') seldom extend beyond twenty-four to thirty-six hours in advance, and are telegraphed and published in bulletins twice daily. In the British Isles they are exceptionally difficult owing to the fact that on the side from which nearly all weather changes come, namely, the west, the existence of the Atlantic Ocean renders telegraphic warning of changes of weather impossible. The fact that a storm is travelling eastward may be telegraphed from America, but there is always a chance of its being dissipated or deflected long before it reaches the coasts of Europe. It having been observed, however, that a storm is always preceded by a fall of the barometer, the tendency to fall is observed some time before the minimum depression occurs; the notice of this tendency, together with observations of the wind and motions of cirrus clouds, are of much importance in the prediction of storms and the enabling of storm warnings to be sent out. The further eastward we travel in Europe the easier does the forecasting of the weather become. See *Cyclone*, *Anticyclone*, *Climate*, etc.,

Methane (me'thān), the chemical name for marsh-gas. See *Firedamp*.

Metheglin (me-theg'lin), a name for the liquor otherwise called *Mead*.

Methodists (meth'o-dists), a sect of Christians founded by John Wesley, so-called from the fact that the name was applied to Wesley and his companions by their fellow-students at Oxford, on account of the exact regularity of their lives, and the strictness of their observance of religious duties. The religious movement which resulted in the foundation of this sect began at Oxford in 1729, the chief leaders besides John Wesley being his brother Charles and George Whitefield (see *Wesley*, *Whitefield*). The first general conference of the Methodists was held in 1744, and the Methodists were constituted a legally corporate body in 1784. Methodism is regarded as a revival of primitive Christian doctrine and discipline. It preaches a full, free and present salvation as the glorious privilege of every man—a theology at once experimental and evangelical. Regeneration is through repentance and faith. There are in addition to the ordained ministers local preachers, class leaders, trustees and stewards. The body is governed by the General Conference, including ministers and laymen, which meets quadrennially and is presided over by the bishops sitting alternately. In each district there is an annual conference of the ministers presided over by a bishop. There are also quarterly conferences which are held under the direction of the district superintendent. The supreme court of Methodism and the chief assembly is the quadrennial General Conference, which has appointive and disciplinary powers. At Wesley's death Methodists numbered 76,968; to-day there are 9,832,000 Methodists. Various secessions have from time to time taken place from the origi-

nal body, which though differing as to points of church government generally agree as to doctrine. The Methodists are especially numerous in the United States, where they form numerically the leading Protestant denomination, numbering about 7,950,000 members. Of the several branches into which they have divided the *Methodist Episcopal Church* is the oldest and most prominent. Since 1845 it has been separated into two branches, the Methodists of the Southern States forming what is called the *Methodist Episcopal Church, South*. These two branches have a combined membership of over 6,347,000. There are also large numbers of colored Methodist Episcopalians, including the three branches of the *African Methodist Episcopal*, about 551,000 in membership; the *African Methodist Episcopal Zion*, 458,700; and the *Colored Methodist Episcopal*, 268,000. There are smaller divisions of the Church, among these being the Methodist Protestant, 186,000 members; the Free Methodists, organized 1860, with 35,000 members. The *Wesleyan Methodists* have a membership of about 20,000, the *Union American Methodist Episcopal*, 18,500, and the *Congregational Methodist*, 21,000, with several others of a few thousands each. In England the Methodists have also divided into a number of branches, chief among them being the *Calvinistic Methodists*, originating in a difference between Wesley and Whitefield concerning the Calvinistic doctrines, and now subdivided into three denominations, the *Whitefield Methodists*, the *Welsh Calvinistic Methodists*, and *Lady Huntingdon's Connection*. There are also the sects of *Bible Christians*, *Wesleyan Reform Union*, *Primitive Methodists* and the *United Methodists Free Churches*.

Methuen (me-thū'en), a city of Essex Co., Massachusetts, on the Spicket River, 2 miles N. N. W of Lawrence. Cotton and woolen goods, stockings, shoes, etc., are manufactured. Pop. (1910) 11,448; (1920) 15,189.

Methylated Alcohol or Spirits.

Spirits to which shellac and methylin alcohol, or wood-spirit, have been added, so as to render the mixture unpalatable. Such a mixture is allowed to be sold without excise duty, for the purpose of manufacture only. It is used as a solvent of resins and gums, in the manufacture of varnishes and aniline colors, and in preserving specimens, burning in spirit and other lamps, as a cleansing agent, and for various other purposes to which ordinary alcohol was formerly applied.

Metonic Cycle, Metonic Year,

the cycle of the moon, or period of nineteen years, in which the lunations of the moon return to the same days of the month; discovered by Meton, an Athenian mathematician, who flourished 432 B.C.

Metonymy (me-ton'u-mi), a figure in rhetoric by which the name of an idea or thing is substituted for that of another, to which it has a certain relation. Thus the effect is frequently substituted for the cause, as when *gray hairs* stands for *old age;* a part for the whole, as when *keel* is put for the whole *ship;* the abstract for the concrete, as 'What doth *gravity* (this *grave person*) out of his bed at midnight?'

Metope (met'u-pe), in architecture, the interval or square space between the triglyphs in the Doric frieze.

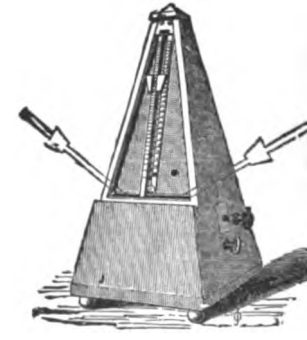
Metre (mē'tẽr), rhythmical arrangement of syllables into verses, stanzas, strophes, etc. See *Rhythm*, *Verse*.

Metre, MÈTRE (French pron. mā-tr), a French measure of length, equal to 39.37 English inches or 3.28 feet, the standard of linear measure, being the ten-millionth part of the distance from the equator to the North Pole, as ascertained by actual measurement of an arc of the meridian.

Metric System of Weights and Measures.

See *Decimal System*.

Metronome (met'ru-nōm), an instrument consisting of a weighted pendulum moving on a pivot and set in motion by clock-work; invented



Metronome, showing extent of vibrations.

about 1814, for the purpose of determining, by its vibrations, the quickness or slowness with which musical composi-

tions are to be executed, so as to mark the time exactly. There is a sliding weight attached to the pendulum rod, by the shifting of which up or down the vibrations may be made slower or quicker. A scale indicates the number of audible beats given per minute, and this must be made to agree with the number attached to the music by its composer.

Metropolis (me-trop'o-lis), a city of Massac Co., Illinois, on Ohio River, 76 miles S. W. of Evansville. It has flour and saw mills, pottery and stave factories, etc. Pop. (1920) 5055.

Metropolitan (me-tru-pol'i-tan), originally a bishop resident in a metropolis or the chief city of a province, now a bishop having authority over the other bishops of a province; that is, an archbishop. In the Greek church, the title of a dignitary intermediate between patriarchs and archbishops.

Metrosideros (me-tro-sid'ér-os), a genus of trees and shrubs, nat. order Myrtaceæ. *M. vera*, known as iron-wood, is a tree, a native

Iron-wood (*Metrosideros vera*).

of Java and Amboyna. Of the wood of this tree the Chinese and Japanese make rudders, anchors, etc. *M. robusta* is the rata of New Zealand, where it is employed in shipbuilding and in other ways. The trees of this genus have thick, opposite, entire leaves, and heads of showy red or white flowers.

Metternich (met'tér-nih), CLEMENS LOTHAR WENZEL, Prince von Metternich, an Austrian statesman, born in 1773; died in 1859. He represented Austria as ambassador at various European courts between 1801 and 1809. In the latter year he became minister of foreign affairs. In this capacity he negotiated the marriage of the Archduchess Maria Louisa with Napoleon and conducted her to Paris. In 1813, after the French reverses in Russia, Austria gave in her adhesion to the other allied powers and declared war against France. From this period the policy, not only of Austria, but in a great measure that also of the leading continental powers, was shaped by Metternich. He was one of the plenipotentiaries who signed the Treaty of Paris, and he presided at the Congress of Vienna (1814). The object of his policy was to arrest the progress of what were called revolutionary principles. With this view he formed the scheme known as the Holy Alliance. He continued in power till, by the revolution of 1848, he was driven from office, and had to flee to England, where he remained till 1851, when he returned and lived in retirement at Vienna.

Metz, a town and important fortress of Alsace-Lorraine, on the Moselle, which here divides into several arms, 79 miles northwest of Strasburg. The major part of the town stands on a height within the fortifications, outside of which there is a series of strong detached forts. The cathedral is a late Gothic structure, surmounted by a spire of open work 397 feet high. The manufactures consist of woolens, cottons, hosiery, hats, muslin, glue, leather, etc. A battle was fought under its walls between the Germans and French in August, 1870, the Germans subsequently invested it, and being reduced to a state of famine, on October 28 it capitulated with 180,000 officers and men under the command of Marshal Bazaine. It was included in the cession of territory to Germany at the peace of 1871, and returned to France at the peace of 1919 (see *Treaty*). Pop. 68,598.

Meudon (meu-dôn), a town in France, department Seine-et-Oise, 6 miles E. N. E. of Versailles, a favorite holiday resort of the Parisians. Rabelais was for a short time curé of Meudon. Pop. (1906) 9597.

Meulen (meu'len), ANTHONY FRANCIS VAN DER, a battle painter, born at Brussels in 1634: and died in 1690. He was employed by Louis XIV to paint the scenes of his military campaigns, and thus his pictures chiefly consisted of landscapes with numerous figures.

Meung, or MEUN, or MEHUN (meun), JEAN DE, a French poet, surnamed from his lameness *Clopinet*, was born at Meung sur Loire, about 1250; died about 1322. He lived at the court of Philippe le Bel, and enjoyed a high reputation as a scholar, a poet, and a satirist.

Meunier (meun-yā'), CONSTANTIN, a Belgian artist, born in Belgium in 1831; died in 1905. His realistic painting and sculpture illustrating the life of the mining poor in Belgium gained wide and deserved popularity. Among his best statues are *Ecce Homo*, *The Shingler* and *Fire Damp*.

Meurthe (meurt), LA, a river of France, which rises on the western side of the Vosges, and joins the Moselle about 7 miles N. of Nancy; total course about 100 miles.

Meurthe-et-Moselle (meurt-é-mo-zel), a department of northeast France, formed in 1871 by uniting portions of the old departments of Meurthe and Moselle, in consequence of the cession by France to Prussia of a portion of her territory on the east under the treaty of Frankfort (May 10, 1871); area, 2024 square miles. The chief river is the Moselle. The soil is generally fertile. The principal cereals are wheat, oats and barley. Fruits are extensively grown, and the annual yield of the vines is large. The principal mineral products are iron ore and salt. The capital is Nancy. Chief towns, Lunéville, Toul, and Longwy. There was heavy fighting in this region during the war, 1914-18. Pop. 564,730.

Meuse (méz), a European river which rises in Haute-Marne, France, and flows across France, Belgium and Holland. It passes Neufchâteau, Commercy, St. Mihiel, Verdun, Sedan, Mézières, then entering Belgium passes Namur, Liége, and finally, in Holland, Maëstrich and Rotterdam, to enter the North Sea by many mouths. It is navigable from Verdun; total length, 500 miles. During the World War, 1914-18, the tide of battle surged over almost the whole of the Meuse region in France and Belgium. The Meuse-Argonne front had been practically stabilized in September, 1914, and except for minor fluctuations during the German attacks on Verdun, 1916, and the French counter-offensive, 1917, remained unchanged until the American advance September 26-November 11, 1918.

Meuse, a department of France; area, 2408 sq. miles. It is traversed by the Meuse. Agriculture is the chief industry. There are fine forests, notably the Argonne (q. v.) Pop. 277,955.

Mexia (mā-hē'ya), a town of Limestone Co., Texas, 40 miles N. E. of Waco. It is situated in the heart of a rich oil field, development of which began in 1921-22. The population in 1920 was 3482. In March, 1922, it had grown to over 30,000.

Mexico (meks'i-kō), a republic of North America, between the United States and Central America, and having on the east the Gulf of Mexico, on the west the Pacific Ocean; area estimated at 767,605 sq. miles. Nearly one-half of this territory lies within the torrid zone, but the peculiar geological structure of the republic, that of a central elevated plateau, bounded on both sides by lowlands of torrid temperature, and rising into volcanic peaks, supported by the two branches of the Mexican Cordilleras, the Northeast and Northwest, causes the greatest diversity of climate. The principal summits, all of volcanic origin, are Popocatepetl (Smoking Mountain), about 17,500 feet, still indicating its activity by occasional clouds of smoke and ashes; Orizaba, or Citlaltepetl (Star Mountain), 18,250, and Ixtaccihuatl (White Lady), 16,960. All these are above the limit of perpetual snow, which is here about 15,000 feet. The largest river is the Rio Grande del Norte, forming part of the boundary with the United States, most of the others are rather insignificant. The lakes, which abound, are individually of little importance; some of them have no outlet. Mexico is a country of great natural resources. There is a vast variety of useful indigenous trees and plants, and many others have been introduced. Rubber is largely produced, and Mexico has become one of the chief sources of this useful material. It is especially the home of the cactus, which grows here in a great variety of forms. The fauna is greatly varied, comprising both temperate and tropical forms, birds of fine plumage being very abundant, as also serpents and saurians. The principal agricultural products are maize and other grains, sisal-hemp, tropical fruits, cotton, coffee, sugar, tobacco, indigo, vanilla, cochineal, etc., some of these growing in the hot lowlands, others, as wheat and corn, on the elevated plateau. Large numbers of cattle are reared, especially in the north. The chief industries (besides agriculture and mining) are the manufacture of cottons and woolens, pottery, tobacco and cigars, leather, soap, sugar refining, brewing and distilling (principally from the agave or maguey), etc. Mexico is rich in minerals, especially silver and petroleum, which are the most valuable of the exports. Other minerals are gold, copper, iron, quicksilver, antimony and sulphur, the latter in vast quantities in the crater of Popocatepetl. The Mexican ports on the Atlantic side are most of them insecure. On the western coast there is, however, a series of

MEXICO
Scale of Miles
0 50 100 200 300 400 500
Railroads
Railroads Projected
Size of type indicates relative importance of places
C.S HAMMOND & CO., N.Y.
GULF OF MEXICO
GULF OF CAMPECHE
GULF OF TEHUANTEPEC
PACIFIC OCEAN
UNITED STATES
TROPIC OF CANCER
REVILLAGIGEDO ISLANDS
Rio Grande
Delta of the Mississippi
YUCATAN CHANNEL
Campeche Bank
Longitude West from Greenwich

magnificent ports, from Acapulco to Guaymas, many of which are scarcely if at all frequented. The imports consist chiefly of cotton, woolen and linen manufactures, wrought-iron and machinery; and the exports of the precious metals, sisal-hemp, coffee, hides and mahogany and other woods. The railways are being rapidly developed, largely by aid of United States capital, and the country being opened to commerce. The length of railways in 1910 was 15,256 miles, including a line across the Tehauntepec isthmus from the Atlantic to the Pacific, with a large transit trade.

Administration, etc.—Mexico is divided into twenty-seven States; two Territories, Lower California and Tepic; and the Federal District, which comprises Mexico, the capital of the republic, and a small portion of the adjoining territory. The population in 1910 was 15,063,207. The proportion of the different races in the population is believed to be 20 per cent. of pure whites, 43 per cent. of mixed race, and the remainder Indians. The Creoles are naturally the dominant race, and the Spanish language is generally spread over Mexico. Roman Catholicism, the state religion of Mexico until 1857, is still the prevailing religion. But there is now no connection between church and state. All religions are tolerated, but no religious body can own landed property. Primary education is compulsory, but the law is not strictly enforced. The schools are supported partly by the central and partly by the state government, and partly by charitable foundations supported by voluntary subscriptions. The present form of government is that of a federal republic, each member of which manages its own internal concerns. The supreme executive power is vested in a president, who has powers very similar to those of the President of the United States. The revenue usually amounts to $60,000,000; the debt, foreign and domestic, amounts to about $226,000,000. The exports in 1910 amounted to $129,508,002; the imports to $97,039,050.

History.—Prior to 1521 Mexico was inhabited by an Aztec race and ruled by native emperors. (See *Aztecs*.) This race had attained a considerable degree of civilization, and interesting remains of its architecture are existent in the teocallis or pyramids of Cholula, Pueblo and Papantla. In 1521 Mexico was conquered by the Spaniards under Hernando Cortez. Cortez called it New Spain, and was created captain-general, but in 1535 was displaced by a viceroy. From that date till 1821 the country was one of the viceroyalties of Spanish America, and governed almost absolutely. The revolution begun by a priest, Hidalgo, in 1810, continued with more or less vigor till 1821, and secured the independence of Mexico. After an unsuccessful attempt to secure a Bourbon prince for the throne, Iturbide, the chief of the insurgents, caused himself to be proclaimed emperor, May 18, 1822, under the title of Augustin I, but was forced to abdicate, March, 1823. A new form of government, on federal republican principles, was then established. Texas rebelled in 1835 and won its independence, and a war with the United States in 1847–48 led to the loss of a great section of its territory. A French army invaded Mexico in 1862, and the Austrian archduke Maximilian was made emperor (1864–1867). In 1871 Juarez was elected president, succeeded by Lerdo de Tejada, who in 1876 was overthrown by Porfirio Dias, who was continuously re-elected until 1910. Francisco Madero in that year organized a revolution, and forced Diaz to resign. Madero was later elected president; but in February, 1913, he too was forced to resign and was soon after assassinated. General Victoriano Huerta, commander of the federal troops, was then proclaimed provisional head of the republic, and before the year was out he had established himself as dictator. The United States refused to recognize Huerta and occupied Vera Cruz, and a revolution against him under Carranza and Villa forced him to withdraw, Carranza succeeding as President. Mexico remained neutral during the European war (q. v.). An attack by bandits under Villa on a New Mexican town led to intervention by the United States in March, 1916. The American forces were withdrawn early in 1917. Carranza was assassinated in May, 1920. General Alva Obregon was elected President in September, 1920.

Mexico, capital of the republic of Mexico, is situated within the state of Mexico in the federal district (473 sq. miles), about 7400 feet above the level of the sea, near several lakes. It is situated at about an equal distance from Vera Cruz on the Mexican Gulf, and Acapulco on the Pacific, and is laid out with great regularity. It is on the site of the ancient city of Tenochtitlan, which was destroyed on the capture of Mexico by the Spaniards in 1521. The principal public buildings are the Cathedral, a large Renaissance building, founded in 1573, on the north side of the Plaza, a public square of 14 acres; the National Palace, used for government offices, on the east side of the Plaza; the City Hall, on the south side of the Plaza; the National Museum, National Library,

etc. There are numerous convents, hospitals, churches, theaters, etc. The manufactures are of comparatively limited extent, and the trade is mostly in the hands of foreigners. This city enjoys a mild climate, and a healthy atmosphere. Pop. (1910), 470,659.

Mexico, one of the states of the Mexican republic; area, 8950 sq. miles. It lies in the south of Mexico, and forms an elevated region, one of the best cultivated and most thickly peopled parts of the republic. Its capital is Toluca, but it embraces within its boundaries the city and Federal District of Mexico. Pop. 975,019.

Mexico, a city, capital of Audrain Co., Missouri, on a branch of Salt River, 50 miles N. by E. of Jefferson City, on three railroads. It is the seat of Hardin College for women and the Missouri Military Academy. It manufactures flour, fire brick, stove linings, shoes, etc. Pop. (1920) 6013.

Mexico, GULF OF, a large bay or gulf of the Atlantic, oval in form and nearly surrounded by a continuous coast line 3000 miles in length, of the United States and Mexico; estimated area, 800,000 square miles. From it is named the Gulf Stream, which issues from it by the Strait of Florida.

Meyer (mī'er), GEORGE VON LENGERKE, cabinet official, was born at Boston, Massachusetts, in 1858. He became a member of the Massachusetts legislature in 1892 and speaker 1894-96. He was sent as ambassador to Italy in 1900, to Russia in 1905, and was appointed Postmaster General in 1907 and Secretary of the Navy in 1909.

Meyerbeer (mī'ér-bār), GIACOMO, musical composer, born in Berlin in 1791; died at Paris in 1864. His father, Jakob Beer, was a rich banker of Jewish descent. He gave early proof of his devotion to music, and at nine was regarded as one of the best pianists in Berlin. He studied under Bernhard Anselm Weber at Berlin, and the Abbé Vogler at Darmstadt, where he began his life-long friendship with Karl Maria von Weber. His first two operas, *Jephtha's Daughter* and *Abimelek*, the one produced at Munich and the other at Vienna, having failed, he went to Italy. There he rapidly composed a series of operas in the Italian style, which were generally well received. In 1826 he went to Paris. There he produced *Robert le Diable* (1831); *Les Huguenots* (Paris, 1836); *Le Prophète* (1849); *Pierre le Grand* (1854); *L'Africaine* (1865), etc. In these Parisian operas he ceases to be an imitator of the Italians, and it is upon them that his fame as a composer is founded. Besides his operas Meyerbeer wrote a great number of songs, an oratorio, cantatas, a *Te Deum*, etc.

Meyrick (mēr'ik), SIR SAMUEL RUSH, an English archæologist, born in 1783; died in 1848. He formed a finely arranged collection of medieval armor, now in South Kensington Museum. His chief work is the beautifully illustrated *Critical Enquiry into Ancient Armor* (best ed. 3 vols., 1844).

Mezereon (me-zē're-on; *Daphne Mezereum*), a well-known shrub grown in gardens, having fragrant pink flowers that appear in spring before the leaves, and are followed by red and poisonous berries. The bark is exceedingly acrid, and has been used in medicine. See *Daphne*.

Mézières (mā-zyār), a town of France, capital of department Ardennes, on the right bank of the Meuse, 120 miles northeast of Paris. It is a fortress of the second class. Pop. 7884.

Mezzanine (met'za-nēn), in architecture, a story of small height introduced between two higher ones; an entresol.

Mezzofanti (met-zo-fän'tē), GIUSEPPE, cardinal, distinguished for his knowledge of languages, was born in 1771, at Bologna, and died at Naples in 1849. He succeeded Mai as keeper of the Vatican library. Towards the end of his life he is said to have understood and spoken fifty-eight languages, but he rendered no valuable services to learning.

Mezzotint (mez'ō-tint; It. *mezzo*, middle, half, and *tinto*, tint), a particular manner of engraving on copper or steel in imitation of painting in Indian ink, the lights and gradations being scraped and burnished out of a prepared dark ground. The surface of the plate is first completely covered with minute incisions, so that it would give in this condition a uniform black impression. The design is then drawn on the face, and the dents are erased from the parts where the lights of the piece are to be, the parts which are to represent shades being left untouched or partially scraped according to the depth of tone.

Miako. See *Kioto*.

Miami (mī-ä'mi), a river of the United States, in Ohio, joining the Ohio below Cincinnati; length 150 miles.

Miami, a town of Gila Co., Arizona, 11 miles from Globe, in a copper-mining district. Water power is derived from the great Roosevelt Dam (q. v.). Pop. (1920) 6689.

Miami, a city, county seat of Dade Co., Florida, beautifully situated on Biscayne Bay, at the mouth of the Miami River. It is a winter resort of great and growing popularity, on account of its beauty of location and its remarkably equable climate. Steamers run from here to Havana, etc. It has extensive fruit and truck-growing interests; grape fruit, oranges, limes, pineapples and other fruits grow in rich abundance. The city has the commission-manager form of government. Pop. (1910) 5471; (1920) 29,549.

Miami, a city, county seat of Ottawa Co., Oklahoma, 80 miles N. E. of Tulsa. It has lead and zinc mines. Pop. (1920) 6802.

Miami University, a coeducational institution of learning at Oxford, Ohio, organized in 1809. It has a college of liberal arts, normal college, etc. The student roll is about 1000.

Miasma, pl. MIASMATA. See *Malaria.*

Miautse (mi-aut'se), a race of people found in the provinces of Yunnan, Kweichow, Kwang-tse and Kwang-tung in China. They are one of the aboriginal tribes of the country.

Mica (mī'ka), a mineral of foliated structure, consisting of thin flexible laminæ or scales, having a shining, pearly, and almost metallic luster. These are sometimes parallel, sometimes interwoven, sometimes wavy or undulated, sometimes representing filaments. The laminæ of mica are easily separated, and are sometimes not more than the 300,000th part of an inch in thickness. The plates are sometimes as large as 18 inches diameter. They are employed in Russia for window panes, and in that state are called *muscovy glass.* Mica enters into the composition of the crystalline rocks, as granite, gneiss, mica schists, chlorites, talcose rocks, and occurs in trappean and volcanic products. It is found also in many sedimentary rocks, as shales and sandstones, giving them their laminated texture. In the latter case, it is derived from the disintegration of the crystalline rocks. It is essentially a silicate of alumina, with which are variously combined small proportions of the silicates of potash, soda, lithia, oxide of iron, oxide of manganese, etc., in accordance with which several species have been constituted, as *common* or *potash mica, lithia mica, magnesia mica, pearl mica.* Regarded as minerals, varieties of mica have received the names of biotite, lepidolite, muscovite, lepidomelane, steatite, etc.

Micah (mī'ka), the sixth of the minor prophets, a member of the tribe of Judah. He prophesied in the reigns of Jotham, Ahaz and Hezekiah, and was a contemporary of Isaiah. His style is pure and correct, his images bold and vivid.

Mica Schist, Mica Slate, a metamorphic rock, composed of mica and quartz; it is highly fissile and passes by insensible gradations into clay-state.

Michael, (mī'kel), ST. (Hebrew, 'he who is equal to God?'), in Jewish theosophy, the greatest of the angels (Daniel x, 13, 21; xii, 1), one of the seven archangels. In the New Testament he is spoken of as the guardian angel of the church (Jude, ver. 9; Rev. xii, 7). There is a festival of St. Michael and All Angels in the Western Church, held on September 29. (See *Michaelmas.*)—The order of St. Michael and St. George is a British order of knighthood dating from 1818. It consists of Knights Grand Cross (G.C.M.G.), Knights Commanders (K.C.M.G.), and Companions (C.M.G.). The ribbon of the order is blue with red stripe down the center. The badge is a white star of seven double rays, having in the center a representation of St. Michael overcoming Satan. The motto is *Auspicium melioris ævi.*

Michael, a kind of sweet orange, native of St. Michael's Island, one of the Azores.

Michael Angelo. See *Buonarrotti.*

Michaelis (mi-hā-ā'lis), JOHANN DAVID, a German theologian and orientalist, born in 1717; died in 1791. He was professor of philosophy in the University of Göttingen from 1745 till his death. His labors in biblical criticism and history are of great value. His principal works are *Mosaisches Recht* (translated into English, under the title of *Commentaries on the Laws of Moses*); *Introductions to the Study of the Old and New Testaments* (the latter has been translated by Marsh); *Translations of the Old and New Testaments;* and grammatical and lexicographical productions.

Michaelmas (mik'el-mas), the feast of St. Michael and All Angels (see *Michael, St.*). It falls on the 29th of September, and is supposed to have been established towards the close of the fifth century. In England, Michaelmas is one of the regular dates for settling rents.

Michaelmas Crocus, the autumn crocus (*Colchicum autumnale*).

Michaud (mi-shō), JOSEPH FRANÇOIS, a French historian and publicist, born in 1767; died in 1839. His principal works are *Histoire des Croi-*

sades, Bibliothèque des Croisades, Biographie Moderne, and *Biographie Universelle* (originated 1811).

Michel (mi-shell), FRANCISQUE XAVIER, a French antiquarian and miscellaneous writer, born at Lyons in 1809; died at Paris in 1887. He edited a large number of old MSS., and translated the works of several British poets. His best-known works are *Les Ecossais en France, et Les Français en Ecosse*, and *A Critical Inquiry into the Scottish Language*.

Michelet (mēsh-lā), JULES, a French historian and miscellaneous writer, was born in Paris in 1798; died in 1874. In 1821 he was called to the chair of history in the Collége Rollin, where he was also professor of ancient languages and of philosophy till 1826. After the revolution of 1830 he was appointed chief of the historical section of the archives of France, and in 1838 became professor of history at the Collége de France. He lost all his offices at the *coup d'état* in 1851. His principal historical works are: *Histoire de France* (18 vols., 1833-66); *Histoire de la Révolution Française* (7 vols., 1847-53); *Histoire Romaine; Précis de l'Histoire Moderne; Précis de l'Histoire de France jusqu'à la Révolution; Origines du Droit Français*. He wrote also a number of works on social subjects, and after 1856 produced several books on natural history and philosophy.

Michigan (mish'i-gan), one of the north-central United States; area, 57,980 square miles. It consists of two separate peninsulas—one projecting eastward between Lakes Superior, Huron and Michigan, and bounded inland by Wisconsin; the other projecting northward between Lakes Michigan, Huron, St. Clair and Erie, and bounded on the south by Ohio and Indiana. It has upwards of 1100 miles of lake-coast, with numerous bays and excellent harbors. The northwestern peninsula, occupying nearly a third of the whole surface, is comparatively elevated, and presents a succession of mountains and lakes, plains, rivers and forests. The surface of the other peninsula is gently undulating, and rises gradually from the lakes towards its center. It is mostly covered with fine forests of timber, interspersed with plains and prairies. Agriculture is the staple industry, the chief cereals being wheat and Indian corn. Wheat of excellent quality is produced on the land cleared of timber. The remaining crops include oats, barley, buckwheat, rye, hay, potatoes, beans, beets, etc. In the w. and s. is a prolific fruit belt, producing apples, peaches, pears, plums and other fruit. The lumber industry once so important, has decreased within recent years; but manufactures have increased at rapid rate. The cultivation of fruit trees is receiving increasing attention, and considerable quantities of apples and peaches are exported. The mines in the northern peninsula contain enormous deposits of red hematite iron ore, of unrivaled purity and excellence, from which are obtained great quantities of iron. Here also are seated very rich copper mines, the copper often occurring in large masses of pure metal. Salt of unsurpassed purity occurs in various parts of the lower peninsula. It is obtained from beds by wells and the yield is large, being second only to that of New York. Manufacturing industries are varied and important. The commerce of the state is greatly benefited by its large navigable waters and by its extensive system of railways, which measure about 9000 miles. The capital is Lansing, but the commercial metropolis and much the largest city is Detroit, Grand Rapids being next in size. In the schools education is free, and excellent provisions are made for advanced studies in higher branches. At the head of the state educational system is the University of Michigan, situated at Ann Arbor. The first settlements in Michigan were made by the French. It was included in the territory surrendered by Britain to the United States after the Revolutionary war. Michigan became a state of the Union in 1837. Pop. (1900) 2,420,982; (1910) 2,810,173; (1920) 3,668,412.

Michigan LAKE, the only one of the Great Lakes lying wholly within the United States; bounded by Michigan, Wisconsin, Illinois, and Indiana. It connects with Lake Huron by Mackinac Strait. Area, 22,400 sq. miles; length, 307 miles; average width, 65 miles.

Michigan, UNIVERSITY OF, a State coeducational institution, at Ann Arbor, Mich., organized in 1837. It has academic, law, engineering, medical, dental and other departments; also Graduate School. Faculty, 617; students, 9400.

Michigan City, a city of Laporte Co., Indiana, situated on Lake Michigan, about 38 miles E. S. E. of Chicago. It contains the Indiana State Prison. It has important manufactures, including railroad cars, chairs, hosiery, gloves, etc. It has steamship lines to Chicago and Milwaukee. Pop. (1910) 19,027; (1920) 19,457.

Michoacan (mē-chō-a-kän'), one of the states of Mexico, on the Pacific Coast; area, 22,656 sq. miles

MICHIGAN
Scale of Miles
0 10 20 40 60 80
Same scale as main map
ISLE ROYALE
LAKE SUPERIOR
APOSTLE ISLANDS
LAKE SUPERIOR
Elevation above Sea Level 602 feet
Pte. Au Sable
Grand Marais
Whitefish Pt.
Whitefish Bay
Marquette
Munising
Escanaba
Menominee
Green Bay
Sturgeon Bay
Manitowoc
Sheboygan
Milwaukee
Racine
Kenosha
Waukegan
Chicago
Benton Harbor
St. Joseph
New Buffalo
Michigan City
South Bend
Elevation above Sea Level 579 feet
LAKE MICHIGAN
Mackinac Island
Mackinaw City
St. Ignace
Cheboygan
Petoskey
Charlevoix
Traverse City
Manistee
Ludington
Muskegon
Grand Haven
Grand Rapids
Holland
Saugatuck
Kalamazoo
Battle Creek
Jackson
Ann Arbor
Detroit
Wyandotte
Monroe
Toledo
Adrian
Hillsdale
Coldwater
Sturgis
Three Rivers
Niles
Elkhart
Goshen
Warsaw
Fort Wayne
Auburn
Angola
Elevation above Sea Level 582 feet
LAKE HURON
Alpena
Thunder Bay
Harrisville
Oscoda
Au Sable
Tawas City
East Tawas
Bay City
Saginaw
West Bay City
Midland
Alma
Mt. Pleasant
Gladwin
Clare
Harrison
Houghton Lake
Roscommon
Grayling
Gaylord
Boyne City
Bellaire
Elk Rapids
Kalkaska
Lake City
Cadillac
Manton
Mesick
Baldwin
Scottville
Manistee
Big Sable Pt.
Pentwater
Hart
Shelby
Whitehall
Muskegon
Ferrysburg
Grand Haven
Holland
Zeeland
Allegan
Otsego
Plainwell
Kalamazoo
Portage
Paw Paw
Benton Harbor
St. Joseph
Coldwater
Hillsdale
Jackson
Ann Arbor
Ypsilanti
Dearborn
Detroit
Wyandotte
Monroe
Toledo
Adrian
Tecumseh
Saline
Chelsea
Howell
Brighton
Pontiac
Mt. Clemens
Port Huron
Marysville
Algonac
St. Clair
Lapeer
Flint
Owosso
Ionia
Greenville
Sidney
Belding
Ithaca
Alma
Mt. Pleasant
Clare
Harrison
Gladwin
Midland
Bay City
Saginaw
West Bay City
Tawas City
East Tawas
Oscoda
Au Sable
Harrisville
Alpena
Thunder Bay
Hubbard Lake
Lincoln
Mikado
Lewiston
Atlanta
Vanderbilt
Elmira
Wolverine
Pellston
Mackinaw City
Mackinac Island
St. Ignace
Cheboygan
Indian River
Topinabee
Wolverine
Pellston
Levering
Carp Lake
Wilderness Park
Mackinaw City
Mackinac Island
St. Ignace
Cheboygan
Petoskey
Harbor Springs
Charlevoix
Boyne City
Boyne Falls
Gaylord
Vanderbilt
Elmira
Atlanta
Hillman
Alpena
Thunder Bay
Hubbard Lake
Lincoln
Mikado
Harrisville
Oscoda
Au Sable
Tawas City
East Tawas
Bay City
Saginaw
West Bay City
Midland
Alma
Mt. Pleasant
Clare
Harrison
Gladwin

It is to a large extent elevated and mountainous, among the mountains being the volcano of Jorullo. It has rich mines of gold, silver, and other minerals. Capital Morelia. Pop. 991,649.

Mickiewicz (mits-kyā'vich), ADAM, a Polish poet; born in 1798; died in 1855. He wrote several epics, and is regarded as the chief national poet of his country.

Mickle (mik'l), WILLIAM JULIUS, poet, born in Dumfriesshire, Scotland, in 1734; died in 1788. At first he engaged in business as a brewer, but not succeeding he devoted himself to literature, and removed to London in 1764. In 1775 appeared his principal production, a translation of the *Lusiads* of Camoens. Among the best of Mickle's original productions is the ballad of *Cumnor Hall*, which suggested to Sir Walter Scott the subject of his novel of *Kenilworth*.

Micmacs (mik'makz), a tribe of North American Indians, mostly inhabiting New Brunswick and Nova Scotia, and numbering some 3600. Their language has been reduced to writing, and a dictionary of it has been compiled.

Microbes. See *Germ Theory*.

Micrometer (mī-krom'e-tėr), an instrument used with a telescope or microscope, for measuring very small distances. Micrometers are variously constructed but in perhaps the most common form (the *filar micrometer*) the principle of operation is that the instrument moves a fine thread or wire parallel to itself in the plane of the image of an object, formed in the focus of a telescope, the wire or thread being moved by means of delicate screws with graduated heads, so that the distance traversed by the wire can be measured with the greatest precision. The micrometer is of the utmost value to the astronomer, and in trigonometrical surveys, and military and naval operations.

Microphone (mī'kru-fōn), an instrument to make faint sounds more audible, invented by David Hughes in 1878. The most sensitive conductor of sound is willow-charcoal, dipped when at white heat into a bath of mercury. A piece of charcoal, thus prepared, placed vertically between two carbon-blocks which are connected with a telephone, is a common form of microphone, and magnifies sounds, otherwise inaudible, enormously.

Microscope (mī'kru-skōp), an optical instrument consisting of a lens or combination of lenses (in some cases mirrors also) which magnifies objects that cannot be seen by the naked eye, or enlarges the apparent magnitude of small visible bodies, so as to permit the study of their minute texture or structure. For a good microscope an achromatic combination of lenses to form an object-glass and a well-made eyepiece are necessary. The magnifying power of an instrument may be increased by (1) increasing the magnifying power of the object-glass; (2) increasing the power of the eyepiece; (3) increasing the distance between the objective and the eyepiece. The single or simplest form of microscope is nothing more than a lens or sphere of any transparent substance, in the focus of which minute objects are placed. When a microscope consists of two or more lenses, one of which forms an enlarged image of objects, while the rest magnify that image, it is called a *compound microscope*. A *binocular microscope* is a microscope with two tubes starting from a point above the object-glass, which is single, and gradually diverging to fit the eyes of the observer. The rays of light arising from the object under observation are caused to diverge into the two tubes by a prism. A *solar microscope* has a reflector and a condenser connected with it, the former being employed to throw the sun's rays on the latter, by which it is condensed to illuminate the object placed in its focus. A *lucernal microscope* is the same in principle as the solar, except that a lamp is used, instead of the sun, to illuminate the object. When an oxyhydrogen lime-light is used it is called an *oxyhydrogen microscope*.

Binocular Microscope.

Microtasimeter (mī-kru-ta-sim'e-tėr), an instrument for measuring extremely small variations in the expansion or contraction caused by heat, moisture, etc. It has been used by astronomers to indicate the altered radiation of heat from the sun during an eclipse or when the atmosphere is filled with moisture.

Midas (mī'das), in Greek mythology, king of Phrygia, whose request that whatsoever he touched should turn to gold was granted by the god Diony-

sus (Bacchus). In this way even his food became gold, and it was not until he had bathed in the Pactolus that the fatal gift was transferred to the river. Another legend is that, in a musical contest between Pan and Apollo, Midas, who was umpire, decided in favor of the former; whereupon the angry Apollo bestowed upon the presumptuous critic a pair of ass' ears.

Tomb of Midas, Phrygia.

Middelburg (mid'l-burg), a town of Holland, capital of the province of Zeeland, near the middle of the island of Walcheren; a well-built and remarkably clean town. It is an ancient place, and was taken by the Dutch from the Spaniards in 1574. Pop. 19,560.

Middle Ages, a term applied loosely to that period in European history which lies between the ancient and modern civilizations. With some writers the period began when the western Roman Empire was overthrown by Odoacer in 476; with others when Charlemagne was crowned emperor of the West in 800; while yet others make it begin when the Frankish Empire ended in 843. The end of the period is variously conceived to have closed with the Reformation in Germany; with the discovery of America by Columbus; with the invention of printing; and with the end of the Thirty Years' war in the Peace of Westphalia (1648). The outstanding political events of the Middle Ages include the rise of the German, French and Italian nationalities; the rise of the Norman power, and the conquest of England by William of Normandy; the crusades; and the establishment of the Holy Roman (or German) Empire. The feudal system and the power of the papal hierarchy were widespread.

Middleboro (mid'l-bur-o), a town of Plymouth County, Massachusetts, 34 miles S. by E. of Boston. It has manufactures of boots and shoes, lumber, woolens, varnish, wood and paper boxes, etc. Pop. (1920) 8453.

Middlesboro, a city of Bell Co., Kentucky, about 46 miles N. of Knoxville, Tennessee. It has coal, coke and iron works and distilling interests. Pop. (1920) 8041.

Middlesbrough (mid'lz-b'ruh), a river port of England, in the North Riding of Yorkshire, 6 miles from the mouth of the Tees and 44 miles north of York. In 1829 the site of Middlesbrough was occupied by a solitary farmhouse. Its rapid growth has been due to its suitability as a port for the Durham coal fields, and to the smelting of the iron ore abounding in the adjacent Cleveland Hills, an industry begun in 1840, and especially associated with the names of Bolckow and Vaughan. There are numerous blast furnaces and rolling mills, foundries, engineering works, shipyards, nail works, bolt and nut works, etc. Salt is being extensively worked also, there being a thick bed of rocksalt at a depth of 1300 feet. The streets are well laid out, and there are the usual institutions of a modern and progressive town. The docks are extensive and commodious. Pop. 104,787.

Middlesex (mid'l-seks), the metropolitan county of England, one of the smallest in the kingdom, but among the most important, from its containing the greater portion of the city of London; area, 283 sq. miles. The surface is flat, except the slight eminences, Hampstead, Highgate and Harrow-on-the-Hill, on the north side of London. The chief river is the Thames, forming the southern boundary. The soil is mostly gravelly, not naturally fertile, but enriched in the vicinity of London by a profuse application of fertilizers. Pop. (1911) 1,126,694.

Middle Temple. See *Inns of Court.*

Middleton (mid'l-tun), a town of England, in Lancashire, 6 miles N. of Manchester and 3½ miles W. of Oldham. Extensive cotton, silk, and other works employ a large part of the inhabitants. Pop. (1911) 27,983.

Middleton, CONYERS, an English writer, born in 1683; died in 1750. He became a student, and in 1706 a fellow of Trinity College, Cambridge. He is best known as the author of a *Life of Cicero* (1741), and a *Free Inquiry into the Miraculous,* the latter

causing its author to be regarded as an infidel.

Middleton, THOMAS (1570-1627), an English dramatist; author of *A Trick to Catch the Old One, The Family of Love, The Phœnix, Michaelmas Term, A Mad World My Masters, The Changeling,* and *The Witch.*

Middletown (mid'l-toun), a city, county seat of Middlesex Co., Connecticut, on the Connecticut River, 16 miles S. of Hartford. It is the seat of Berkeley Divinity School (Protestant Episcopal), Wesleyan University (Methodist), State Hospital for the Insane, and State Industrial School for Girls. It has manufactures of hydraulic machinery, woolens, cottons, silk, hardware, silver-plated ware, toys, rubber, etc. It is connected with Portland by a long drawbridge. Pop. (1910) 20,749; (1920) 22,129.

Middletown, a city of Orange Co., New York, 24 miles W. S. W. of Newburgh, on the Erie, the Ontario & Western and the Middletown & Unionville R. Rs. It has railroad shops and manufactures of condensed milk, leather, saws, files, straw hats, candy, cut glass, gloves, lumber, hoists, pilers, printers' metal furniture, and other products. It has the Middletown Sanitarium and the State Homœopathic Hospital. Pop (1910) 15,313; (1920) 18,420.

Middletown, a city of Butler Co., Ohio, on the Miami River, the Miami and Erie Canal, and the New York Central, B. & O., and Pennsylvania lines. There are 15 paper mills located here; also manufactures of tobacco, bicycles, motor cycles, steel and iron, and many other products. The industrial payroll is $1,000,000 a month; total capitalization of industries approximating $60,000,000. Pop. (1910) 13,152; (1920) 23,594.

Middletown, a borough of Dauphin Co., Pennsylvania, on the Susquehanna River, 9 miles S. E. of Harrisburg, on the Pennsylvania and the Philadelphia & Reading R. Rs. It has car shops, furniture and shoe factories, etc. Pop. (1920) 5920.

Midgard (mid'gard), in Scandinavian mythology, the abode of the human race, formed out of the eyebrows of Ymir, one of the first giants, and joined to Asgard, or the abode of the gods, by the rainbow-bridge.

Midge (midj), the ordinary English name given to numerous minute species of flies, resembling the common gnat. The eggs are deposited in water, where they undergo metamorphosis.

Midhat Pasha (mid'hät pä'shä), a Turkish statesman, born in 1822; died in 1884. He was educated in Constantinople; entered the Turkish civil service; attracted attention by his administrative capacity; became governor of Bulgaria in 1862, and was ultimately in 1876 created grand vizier. In this position he was supreme in the palace, and caused Abdul Aziz and Murad V to be deposed. In the following year, however, he was himself banished; and in 1881, after a judicial investigation into the murder of Abdul Aziz, he was condemned and exiled to Arabia, where he died.

Midianites (mid'i-an-īts), an Arabian tribe, represented in the Old Testament as the descendants of Midian, son of Abraham by Keturah (Gen. xxv, 2), and described as engaged at an early period in commerce with Egypt. They dwelt in the land of Moab (Arabia Petræa), to the southeast of Canaan. One portion of them inhabited the country on the east of the Dead Sea.

Midland, a city, county seat of Midland Co., Michigan, on the Titabawassee River, 20 miles N. W. of Saginaw. Industries include the manufacture of chemicals, cement blocks, and tiles. Pop. (1920) 5483.

Midland, a borough of Beaver Co., Pennsylvania, on Ohio River, 28 miles N. W. of Pittsburgh. It has steel mills, etc. Pop. (1920) 5452.

Midland, a town of Simcoe Co., Ontario, on Georgian Bay, 90 miles from Toronto. There are lumber, flour, woolen and planing mills, sash and door factories, machine shops, smelter, shipbuilding yards, etc. Hydro power from Severn River. Pop. 7500.

Midnapur (mid'na-pör), a town of Bengal, capital of Midnapur district. It is 68 miles W. by S. of Calcutta, and has brass and copper works and an active trade. Pop. 32,740.

Midrash (mid'rash), is the general name given among the Jews to the exposition of the hidden meaning of the Scriptures. It includes any and every ancient exposition on the law, psalms, and prophets.

Midshipman (mid'ship-man), in the United States and British navies, the lowest grade of line or executive officers. In the United States, prior to 1862, students studying for commissions in the navy were designated 'acting midshipmen,' later 'cadet midshipmen,' still later 'naval cadets,' and since 1902 'midshipmen.' On graduating from the U. S. Naval Academy at Annapolis (q. v.) they are commissioned 'ensigns.'

Midsummer Day is the feast day of the nativity of St.

John the Baptist, and is commonly reckoned the 24th of June. On midsummer eve, or the eve of the feast of St. John, it was the custom in former times to kindle fires (called St. John's fires) upon hills in celebration of the summer solstice.

Midwifery (mid'wĭf-rĭ), a branch of medicine or surgery, also called obstetrics, being the art of aiding and facilitating childbirth, and of providing for the preservation of the health and life of the mother during and after her delivery.

Mifflin, Fort, a fort on Mud Island, in the Delaware River, 7 miles from Philadelphia, forming one of the defences of that city.

Mifflin, Thomas, born in Philadelphia, Pennsylvania, of Quaker parents in 1744; died in 1800. He was a member of the first Continental Congress (1774), and on the outbreak of hostilities volunteered for service. He received rapid promotion, and was in 1776 appointed quarter-master-general, attaining the rank of major-general in the following year. He was a ringleader in the Conway Cabal, which had for its purpose the substitution of General Horatio Gates for Washington as commander-in-chief. The intrigue failing, and charges of mismanagement having been brought against him, he retired in 1779. He held subsequently, among other official posts, that of delegate to Congress (1782–84), president of that body (1783–84), member of the Federal Constitutional Convention (1787), and first governor of Pennsylvania (1790–99).

Mignonette (mĭn'yon-et; *Reseda odorāta*), a well-known fragrant annual plant of the nat. order Resedaceæ, a native of Egypt. It is largely cultivated in flower-pots, in apartments, and in the boxes which are placed outside windows. A sub-biennial variety, called *tree mignonette*, rather more odorous than the common sort, is well suited for the drawing-room.

Migration of Animals, the phenomenon of certain animals moving, either periodically or at irregular times and seasons, from one locality or region to another, sometimes far distant. Migration has been observed in mammals, birds, fishes, and insects, but it probably occurs in other groups of the animal world, the observation of which is less easy than that of the higher forms. The buffaloes or bisons of North America used, it would seem, to migrate in herds from one place to another. Many fishes (for example salmon, lampreys, etc.) make periodical journeys from the sea towards fresh water streams and rivers for the purpose of depositing their eggs. The migratory habits of locusts, and those of certain species of ants, etc., exemplify migration among insects; but among the birds we meet with the best marked instances of migration. With sea birds (for example, puffins), the day of arrival or that on which they appear in certain localities may be prognosticated with perfect safety; and similarly, the day of departure appears in some birds (for example, swifts) to be almost as accurately timed. Storks have been known to return regularly to their old nests, and the same has been observed of swallows. The mode in which birds migrate varies greatly even in those of the same species. The swallows migrate in bodies comprising vast numbers, and so also do cranes, wild ducks, geese, and many other forms. The migratory flight is generally made against the wind; and certain species of birds, as quails, for instance, appear to wait for favoring winds, and to delay their flight by resting on islands when the wind is unfavorable. Regarding the causes of migration, science cannot at present definitely pronounce. Probably a combination of causes, or different causes in different cases, as scarcity or plenty of food-supply, the powerful influences of temperature, and the influence of the breeding season, may contribute to the migratory 'instinct.' It has been further suggested by Mr. A. R. Wallace that this migratory habit or instinct has gradually been acquired since a time when the breeding and feeding grounds of the animals were coincident, these having been gradually separated by climate and geological changes.

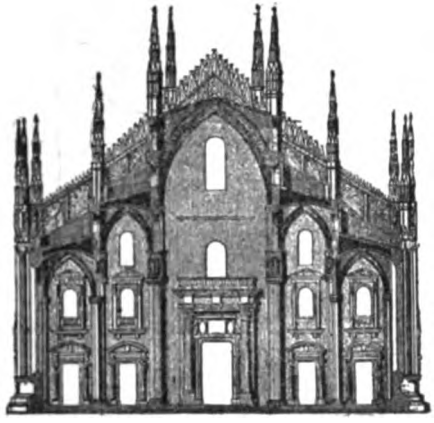
Mihrab (mih'rāb), an ornamented recess or alcove in a mosque, near the mimbar or pulpit. The people pray in front of the mihrab, which always marks the direction of Mecca.

Mikado (mi-kä'dō), the emperor of Japan, the spiritual as well as temporal head of the empire. See *Japan*.

Miknas. See *Mequinez*.

Milan (mĭ'lan; Italian, *Milano;* German, *Mailand;* Latin, *Mediŏlānum*), a city of Northern Italy, capital of the province of its own name, situated on the small river Olona, in the middle of the Lombard plain between the Adda and Ticino. The town is built in the form of an irregular polygon, and is partly surrounded by a wall or rampart,

outside of which runs a fine road shaded by chestnut trees. The city is entered by eleven gates, several of which are magnificent, and the leading streets proceeding from these gates are tolerably wide, well paved, and lighted. The chief open space is the Piazza d'Armi (Place of Arms), part of which has been made into an amphitheater capable of containing 30,000 spectators. The castle, now a barrack, fronts the Piazza d'Armi on one side; at the opposite side is the Porta Sempione with the fine Arco Sempione or Arco della Pace, built of white



Section of Cathedral, Milan.

marble. The Piazza del Duomo, in front of the cathedral, is the center of the traffic of Milan. Among the public edifices the first place belongs to the Duomo or cathedral, a magnificent structure, inferior only in size to St. Peter's at Rome and the cathedral of Seville. It is built of brick faced with white marble, and is 477 feet in length, 183 feet in width, nave 155 feet high, cupola 220 feet, tower 360 feet. The prevailing style is Gothic; in form it is a Latin cross; it is ornamented with turrets, pinnacles, and 2000 statues; and the roof is of white marble. It was begun in 1386, and was only completed in 1805. There are many other fine edifices, among them being the Palazzo di Brera or Delle Scienze Lettere ed Arte, containing the picture gallery and the library of the academy (200,000 vols.); and the Ambrosian Library, the earliest, and still one of the most valuable public libraries in Europe. The chief theater is La Scala, accommodating 3600 spectators. The manufactures include silks, cottons, lace, carpets, hats, earthenware, jewelry, etc.—The first distinct notice of Milan occurred B.C. 221, when it was subdued by the Romans. In the third century after Christ it ranked next to Rome. It became a republic in 1101, and having refused to submit to the Emperor Frederick I, it was destroyed by him in 1162. It was soon rebuilt, but long continued to be torn by internal factions, headed by the leading nobility, among whom the Visconti and Sforzas were the most prominent. At a later date it belonged, in common with Lombardy, to Austria, until 1859, when by the Peace of Villafranca Lombardy was ceded to Piedmont. Pop., including suburbs, (1911) 599,200.

Milazzo (mi-lät'zō), a seaport in Sicily, about 22 miles west of Messina. Here Garibaldi defeated the Neapolitan troops in his Sicilian campaign of 1860. Pop. 16,422.

Mildew (mil'dū), a name given to various minute parasitic fungi producing a state of disease or decay in living and dead vegetable matter, and in some manufactured products of vegetable matter, such as cloth and paper. Numerous cultivated crops, fruit trees, etc., suffer from mildew.

Mile (mīl), a measure of length or distance, and used as an itinerary measure in almost all countries of Europe. The English and American statute mile contains 8 furlongs, each 40 poles or perches, of 5½ yards. The statute mile is therefore 1760 yards, or 5280 feet. It is also 80 surveying chains, of 22 yards each. The square mile is 6400 square chains, or 640 acres. The Roman mile was 1000 paces, each 5 feet; and a Roman foot being equal to 11.62 modern English inches, it follows that the ancient Roman mile was equal to 1614 English yards, or very nearly 11-12ths of an English statute mile. The ancient Scottish mile was 1984 yards = 1.127 English miles; the Irish mile, 2240 yards = 1.273 English miles; the German short mile is 3.897 English miles, the German long mile 5.753. The geographical or nautical mile is the sixtieth part of a degree of latitude, or 2028 yards nearly.

Mileage (mīl'ij), in the United States, fees paid to certain officials, such as members of Congress, of State legislatures, etc., for their traveling expenses, at so much per mile. The system has in the past led to gross abuses, each senator and representative estimating for himself the distance he had traveled. Now, however, there is a fixed table of mileage, the total annual cost for both houses of Congress being nearly $150,000.

Miles (mīlz), NELSON APPLETON, soldier, was born at Wachusettsville, Massachusetts, in 1839. In 1861, at the outbreak of the Civil war, he entered the service as captain of volunteers and took part in most of the principal engagements in Virginia, rising in rank to major-general of volunteers in 1865. He continued in the regular army, being made colonel in 1867, brigadier-general in 1880, and major-general in 1890, and taking part in the operations against the Apaches and other Indian tribes. He was the senior officer commanding the United States army during the Spanish war, and led in person the expedition, against Porto Rico in 1898.

Miles City, county seat of Custer Co., Montana, 114 miles N. E. of Billings, in a cattle and sheep-raising district. Pop. (1920) 7937.

Milfoil (mil'foil), the common name of *Achillea millefolium*, nat. order Compositæ, a plant which grows commonly on banks, by road sides, and on dry pastures. It has numerous very finely divided leaves, and corymbs of small, white, or sometimes rose-colored flowers. The plant has highly astringent properties.

Milford (mil'fẽrd), or MILFORD HAVEN, a seaport in the county of Pembroke, Wales, on the north shore of the inlet called Milford Haven.

Milford, a town (township) of Worcester County, Massachusetts, containing a manufacturing village of same name, 32 miles S. W. of Boston. Here are extensive granite quarries and manufactures of boots and shoes, straw and rubber goods and machinery. Pop. (1910) 13,055; (1920) 13,471.

Military Orders, in Europe, religious associations whose members united in themselves the double characters of monk and knight. These orders arose about the period of the Crusades, the first to be formed being the Hospitallers. Their primary duties were to tend sick pilgrims at Jerusalem, afterward to protect them also on their way to the Holy City. The order of the Templars soon followed, and to these many others were later added. These religious associations have mostly been

abolished or have fallen into disuse, though some still subsist as orders of knighthood.

Militia (mi-lish'a), a general term which means the able-bodied male citizens of a country liable to military service, whether or not they are organized. In most countries men between the ages of eighteen and forty-five are considered included in the militia. The United States militia consists of every male citizen of the respective States, Territories, and the District of Columbia, and every male of foreign birth who has declared his intention to become a citizen, who is more than 18 and less than 45 years of age. The *Organized Militia* is divided into two classes: the National Guard and the Naval Militia. During the European war the National Guard was incorporated into the service of the United States, and the organized militia of the separate States practically ceased to exist. See *National Guard, Conscription, Britain, France*, etc.

Milk, the secretion peculiar to the females of the class Mammalia, which is secreted in the mammary glands, and which is employed as the nutritive fluid of the young mammal after its birth. Examined by aid of the microscope, milk is seen to consist of a clear fluid, containing many globules, the average size of which is about $\frac{1}{10000}$ of an inch in diameter, and each appears to consist of oily matter invested by a thin layer of albumin. When churned, the globules in the milk are forced together *en masse*, and constitute butter. The cream of milk is formed by the globules rising to the top of the milk without coalescing; the 'skim'-milk, or that left after the cream is formed, being of a pale bluish color, owing to its being deprived of its fatty or oily particles. In itself, milk exhibits the type of a perfect food. The *casein* of milk represents the albuminous or flesh constituents of food; the butter supplies the fatty or oleaginous parts; the water exists as such in milk, while it contains the saccharine constituents in the form of milk-sugar, and the inorganic parts in the form of phosphates of lime and alkaline chlorides, so necessary for the production of bone. The milk of every animal has certain peculiarities which distinguish it from all other milk, but the general properties are the same in all. The specific gravity of milk varies from 1.03 to 1.04. In the making of butter, cream is allowed to stand for some time, during which an acid is generated. It is then put into a churn and agitated, when the butter gradually separates. The *butter-milk*, or that left after the separation of the butter by churning, contains the casein, sugar, etc., of the milk; and the milk left after creaming also contains the greater part of the casein and milk-sugar. Milk may be coagulated by various substances, but *rennet*, prepared from the fourth stomach of the calf, is generally used for domestic purposes. The result of coagulation is to separate the milk into a thin fluid, or *whey*, and a thick whitish deposit, the *curd*. (See *Butter, Cheese.*) Whey has a pleasant taste, and contains a large quantity of milk-sugar, hence it is frequently used as drink, and from its nutritious quality it is administered to delicate people. It is also sometimes made to undergo fermentation, by which a very weak spirituous fluid is obtained. (See *Koumiss.*) In some States milk is not permitted to be sold which does not contain a fair amount of the proper nutritive constituents. It has been hel that even milk wholly derived from the cow, if below the standard at which with proper feeding cow milk can reasonably be maintained, is adulterated within the meaning of the act, but no exact standard of purity has been established. Condensed milk (which see) is now largely used, and consists of ordinary milk which has undergone a process of evaporation and been mixed with sugar. Milk is very liable to be infected with the germs of disease, either from disease in the cow, contamination from unhealthy persons, or the use of infected water in cleaning vessels; and many epidemics of zymotic disease have been traced to impure milk.

Milk-fever, a febrile state sometimes induced in women when the milk begins to be secreted after parturition. It is accompanied with severe pains and throbbing in the head, flushing in the face, thirst, heat and dryness of skin. The pulse is full, the tongue furred, bowels costive, urine scanty, and light and sound are painful. The treatment consists in cooling saline purgatives, good ventilation and moderate temperature in apartments, and encouraging the free flow of milk. Other medicines may be necessary. Milk-fever attacks the lower animals, and in cows it is best prevented by unstimulating diet, and by milking the cow regularly ten days before calving.

Milk-plant. See *Jew-bush.*

Milk-snake, the *Ophiobŏlus eximius*, a harmless snake of the United States.

Milk-tree. See *Cow-trees.*

Milk-weed, a name for plants of the genus *Asclepias.*

Milkwort (milk'wêrt), a pretty plant, *Polygăla vulgăris*, order Polygalaceæ, abounding in a milky juice, and believed by the ignorant to promote the flow of milk in the breasts of nurses.

Milky-way. See *Galaxy*.

Mill, originally, a machine for grinding and reducing grain or other substance to fine particles; now applied also to machines for grinding or polishing by circular motion, and especially to complicated machinery for working up raw material and transforming it into a condition in which it is fit for immediate use or for employment in a further stage of manufacture. In the first sense of the word we have *flour-mills* and *meal-mills, cider-mills, coffee-mills;* in the second sense we speak of a *lapidary's mill;* and in the third sense we speak of *cotton-mills, spinning-mills, weaving-mills, oil-mills, saw-mills, bark-mills, fulling-mills,* etc. The word commonly includes the building for the special accommodation of the machinery, as well as the machinery itself. The oldest kind of flour or meal mill was the handmill or *quern* (which see). See also *Grinding*.

Mill, James, born at Logie Pert, Forfarshire, Scotland, in 1773; died in 1836. He was educated at the grammar school of Montrose and the University of Edinburgh; received license as a preacher, but abandoned this profession as the result of a change in his theological opinions; accompanied Sir John Stuart to London and became tutor in his family; edited the *Literary Journal*, and contributed articles to the various reviews; also writing a *History of British India*. In consequence of the knowledge which his researches had given him of Indian affairs, he was appointed assistant-examiner of correspondence by the East India Company, and soon afterwards became chief-examiner. He was a large contributor to the *Westminster Review;* wrote articles on social and political subjects for the *Encyclopedia Britannica;* published a treatise on the *Elements of Political Economy* (1821-22), and an able *Analysis of the Phenomena of the Human Mind* (1829), etc.

Mill, John Stuart, son of James Mill, was born in London in 1806; died at Avignon in 1873. He was trained under the immediate influence of his father, and at the age of three began to study the Greek alphabet, while at eight he was studying Herodotus, Xenophon, and Plato, and entering upon a course of Latin, Euclid and algebra. At the age of fourteen he entered upon a course of political economy, and thereafter this strenuous education of the boy ceased—so far, at least, as the strict surveillance of his father was concerned. It left a deep influence, however, upon his subsequent life and labors. His fifteenth year was spent in France; on his return he studied law for a time, and in 1823 he obtained a clerkship in the East India House, remaining in the company's employment till it was supplanted by the crown in 1858. In 1823 the *Westminster Review* was begun by the followers of Bentham, and young Mill was one of its earliest contributors, while from 1835 to 1840 he was its principal conductor. In his twenty-first year he edited Bentham's work *On Evidence*. In 1843 appeared the first of his two chief works, *A System of Logic, Ratiocinative and Inductive*, the second being *Principles of Political Economy*, 1848. To these he afterwards added his work *On Liberty*, 1859; *Thoughts on Parliamentary Reform*, 1861; *Utilitarianism*, 1862; the *Examination of Sir William Hamilton's Philosophy*, and a *Study of Auguste Comte and Positivism*, 1865. In this last year he was returned to parliament as member for Westminster, where he advocated a measure to admit women to the suffrage, took part in the Reform Bill debates, etc. At the election of 1868 he was defeated and retired to Avignon. Besides the works already mentioned he published *Considerations on Representative Government*, 1861; *The Subjection of Women*, 1869; and *The Irish Land Question*, 1870. His *Autobiography* was published in 1873, and the three essays, *Nature, The Utility of Religion* and *Theism*, in 1874. Mill's works on logic and political economy are standard text-books. In the former he placed the system of inductive logic on a firm basis. See *Logic*.

Millais (mil'ăs), Sir John Everett, was born at Southampton in 1829. He gained his first medal for drawing when nine years old; became a student at the Royal Academy; exhibited his first picture, *Pizarro Seizing the Inca of Peru*, in 1846; and received the gold medal for an historical painting, *The Tribe of Benjamin Seizing the Daughters of Shiloh*, in 1848. In his earlier days he was a leader of the Pre-Raphaelite School, but on attaining maturity in art he abandoned the peculiarities for which that school is noted. As the result of this new departure Millais painted such pictures as *Ferdinand Lured by Ariel, Mariana in the Moated Grange, The Huguenot Lovers, The Black Brunswicker* and *Ophelia*, while its influence was also apparent in his landscapes of *Chill October, The Fringe of the Moor*,

etc. Among his later works are, *The Northwest Passage*, *The Princess in the Tower*, *Effie Deans*, *Cinderella* and *Mercy—St. Bartholomew's Day, 1572*. In portraiture he held the foremost rank, and painted a number of the most distinguished men of his day. He was made a baronet in 1885, and was decorated with the Legion of Honor. Many of the works of Millais are well known by engravings. He died in 1896.

Millar, Alexander Copeland, American educator, born at McKeesport, Pa., in 1861, taught English and German in Grove's High School, Dallas, Texas, became president of the Central Collegiate Institute of Altus, Ark. (now the Hendrix College). He was ordained a minister of the Methodist Episcopal Church, 1888, and was for many years on the staff of the *Western Methodist*, first as associate editor, then as editor-in-chief. He is the author of *Twentieth Century Educational Problems*, and a number of poems. He was head of the good roads movement in Arizona and president of the State Teachers' Association.

Millau (mē-yō), a town of Southern France, department of Aveyron, 31 miles southeast of Rodez. It has coal mines, manufactures of leather, leather gloves, silk mills. Its fortifications were destroyed by Louis XIII in 1620. Pop. 16,673.

Millbury, a town of Worcester Co., Massachusetts, on the Blackstone River, 6 miles S. E. of Worcester. It has manufactures of cotton and woolen goods, thread, felt, etc. Pop. (1920) 5652.

Milledgeville (mil'ej-vil), a city, county seat of Baldwin Co., Georgia, on the Oconee River, 32 miles N. E. of Macon. Seat of Georgia Military College, Normal and Industrial College and State Sanitarium for Insane. It is in a cotton district and was the capital of the State 1807-67. Pop. 4619.

Millennium (mil-en'i-um), an aggregate of a thousand years; a word used to denote the thousand years mentioned in Rev. xx. 1-5, during which period Satan will be bound and restrained from seducing men to sin, and during which, millenarians believe, Christ will reign on earth with his saints. The near approach of the millennium has been often foretold.

Millepede (mil'i-pēd; L. *mille*, a thousand, *pes*, *pedis*, a foot), a name common to animals resembling centipedes, of the order Myriapoda, from the number of their feet. The most common is the *Iulus sabulosus*, about 1¼ inches long. The young when hatched have only three pairs of legs, the remainder being gradually acquired till the number is complete, which is usually about 120 pairs.

Millepora (mil-ep'o-ra), Milleporidæ, a genus and family of reef-building branching corals.

Miller (mil'er), Hugh, geologist, was born at Cromarty, Scotland, in 1802, and became a stone-mason. While working at his trade he studied literature, wrote a good deal, and in particular became proficient in geology. His first publication appeared in 1829, under the title of *Poems Written in the Leisure Hours of a Journeyman Mason*, and this was followed in 1835 by the prose volume of *Scenes and Legends of Cromarty*. He was then appointed to a post in a bank at Cromarty, and while employed in this capacity took an active part in the religious controversy that ended in the Disruption (which see). In 1840 he went to Edinburgh as editor of the *Witness* newspaper, after 1843 the chief organ of the Free Church. In this paper he printed the work subsequently published under the title of *The Old Red Sandstone*, which attracted the immediate attention of the scientific world and established his reputation as a geologist. This was followed by *First Impressions of England and its People; Schoolmasters*, a charming account of his earlier life; and *The Testimony of the Rocks*, in which he tried to reconcile the Mosaic account of creation with the teachings of geology. Having just finished this latter work, his brain collapsed from over-pressure, and he died by a pistol-shot from his own hand at Portobello in 1856. His *Schools and Schoolmasters* was supplemented by *Life and Letters*, published in 1871. Besides the volumes already mentioned, his collected works include *Essays Historical and Critical; The Cruise of the Betsy; Rambles of a Geologist; Tales and Sketches; Edinburgh and its Neighborhood* and *The Headship of Christ*.

Miller, Joaquin, the pen name of Cincinnatus Heine Miller, born in Indiana in 1841. He spent some time in the California mining districts; lived with the Modoc Indians for five years; edited a newspaper called the *Democratic Register;* studied law and was called to the bar in Oregon, and became district judge in Canon City. He subsequently settled in New York. He has written *Pacific Poems* (1873), *Songs of the Sierras* (1873), *Songs of the Sun Lands* (1873), *Songs of the Desert* (1875), besides novels and dramas, and is noted for his graphic pictures in verse of frontier life and incident. He died February 17, 1913.

Miller, WILLIAM, a religious enthusiast, was born in Pittsfield, Massachusetts, in 1782; died in 1849. He studied the prophecies of the Bible and in 1831 predicted the second coming of Christ in 1843, to reign over the earth for a thousand years. He founded the sect known variously as Millerites or Second Adventists.

Millerand (mēl'raṇ), ALEXANDRE (1859-), President of the French republic, born in Paris. He was educated for the bar. Elected to the Chamber of Deputies in 1885, he championed the cause of labor and gained a reputation as a moderate Socialist. His first ministerial post was Minister of Commerce. He was Minister of Public Works in the Briand cabinet, 1909; Minister of War in the Poincaré cabinet, 1912. In Viviani's coalition cabinet, formed in 1914, at the outbreak of the European war, he was again Minister of War, a post he resigned in 1915. He succeeded Clemenceau as Premier in January, 1920, and his notable conduct of France's foreign policy raised him into pre-eminent eligibility for the presidency, an honor accorded him at the National Assembly elections of September, 1920. He succeeded Paul Deschanel, who resigned the presidency because of illness.

Miller's Thumb. See *Bullhead.*

Millet (mil'et), a common name for various species of cereals yielding abundance of small seeds, more particularly called *Panicum miliaceum* and *P. miliare*, cultivated in the East Indies, China, Arabia, Syria, Egypt, etc., where it is used as human food. The leaves and panicles are given both green and dried as fodder to cattle. *German millet* (*Setaira germanica*) is cultivated on account of its seeds, which are used as food for cage-birds. *Italian millet* (*Setaria italica*) is a closely allied species. For other grains known as millet, see *Dhurra* and *Dukhn.*

Millet, FRANCIS DAVIS, an American artist and author, was born at Mattapoisett, Massachusetts, November 3, 1846, and died in the great 'Titanic' disaster April 15, 1912. He was director of decorations at the Columbian Exposition of 1893, and was successful in the fields of mural and genre painting.

Millet (mi-lā), JEAN FRANÇOIS, a French artist, born at Gruchy, near Cherbourg, in 1814; died in 1875. He worked with his peasant father in the fields; studied drawing at the academy of Cherbourg; from thence passed with an allowance from this town to the atelier of Delaroche, in Paris, and exhibited at the Salon in 1840. As a student and until the death of his first wife, in 1844, he was frequently in the greatest poverty, and his life subsequently was by no means free from difficulty. In 1849 he left Paris and settled among the peasants of Barbizon, on the edge of Fontainebleau Forest, and devoted himself to transferring their simple everyday life to his canvases, which he did with great truth of sentiment and subdued poetic charm. Of his paintings may be mentioned *The Sheep-shearers*, *The Gleaners*, *The Sower*, *The Shepherdess with Her Flock* and *The Angelus.* The last named has attracted special attention, and his pictures are highly esteemed and sell at enormous prices.

Milliard (mil'yard), the French collective name for a thousand millions; familiar in connection with the five milliards of francs (5000 millions of francs, or $1,000,000,000) paid by France as war indemnity to Germany in 1871-1873.

Milligramme (mil'i-gram), in the system of French weights and measures, the thousandth part of a gramme, or .0154 of an English grain.

Millimetre (mil'i-mē-tèr), a French lineal measure containing the thousandth part of a meter; equal to .03937 of an inch.

Millvale (mil'vāl), a borough of Allegheny Co., Pennsylvania, on the Allegheny River, opposite Pittsburgh, with which it is connected by a bridge. It has lumber mills, stone and iron works, and manufactures of saws, boxes, metal and novelty ware, etc. Pop. (1920) 8031.

Millville (mil'vil), a city of Cumberland Co., New Jersey, on Maurice River at the head of deep-water navigation and on West Jersey Railroad., 40 miles S. by E. of Philadelphia. It has glass factories, extensive bleach and dye works, a cotton mill, wrapper and shirt-waist factories, etc. It ships fish, produce, and sand and gravel. Pop. (1910) 12,451; (1920) 14,691.

Milman (mil'man), HENRY HART, born in London in 1791; died in 1868. He was educated at Dr. Burney's Academy, Greenwich, at Eton and at Oxford. In 1812 he received the Newdegate prize for an English poem on the Apollo Belvidere; published *Fazio*, a tragedy, which was performed at Covent Garden Theater; and in 1815 was appointed vicar of St. Mary's, Reading. He delivered the Bampton lectures in 1827; became professor of poetry at Oxford, 1821-31; appointed rector of St. Margaret's, Westminster, in 1835, and dean of St. Paul's in

1849. His principal works are: *Samor*, a legendary poem (1818); *The Fall of Jerusalem* (1820); *The Martyr of Antioch* (1821); *History of the Jews* (1829); *History of Latin Christianity* (1855); etc. His last work was the *Annals of St. Paul's Cathedral*, which, after his death, was completed and published by his son.

Milne-Edwards (mĭln-ed'wârdz), HENRI, a French naturalist, the son of English parents, was born at Bruges in 1800; died in 1885. He studied medicine and received his degree in Paris; succeeded Cuvier at the Academie des Sciences in 1838; was appointed professor of natural history at the Museum in 1841; professor of zoology in 1862. He published *Elements of Zoology*, *Natural History of Crustaceans*, etc., but his great work was *Leçons sur la Physiologie et l'Anatomie Comparée* (1857-83, 14 vols.).

Milo. See *Melos*.

Milreis (mĭl'rēs), a Portuguese coin, equal to one thousand *reis*, or a little over one dollar.

Mil'roy, ROBERT HUSTON (1816-90), an American soldier, born in Washington county, Ill., educated at Norwich University, Vt. In 1850 he graduated from the law school of the Indiana University and was appointed circuit court judge. At the outbreak of the Civil War he joined the northern forces, becoming later a brigadier-general in 1862. He fought under McClellan and Rosecrans in West Virginia, and under Fremont in the Shenandoah Valley. He became major-general of volunteers in 1862. He attempted to hold Winchester, Va., against Lee's forces but was defeated with heavy loss. His conduct was investigated, but he held that by detaining Lee's army at Winchester he had given opportunity to Meade to collect his forces at Gettysburg. Toward the close of the war his conduct was again made the subject of investigation and he resigned from the army.

Milt. See *Spleen*.

Miltiades (mĭl-tī'a-dēz), an Athenian general of the fifth century B.C. When Greece was invaded by the Persians he was elected one of the ten generals, and drew up the army on the field of Marathon, where, B.C. 490, he gained a memorable victory. Next year he persuaded the Greeks to intrust him with a fleet of seventy vessels, in order to follow up his success. With this, to gratify a private revenge, he attacked the island of Paros, but was repulsed, and dangerously wounded. On his return to Athens he was impeached, and thrown into prison, where he soon after died of his wound.

Milton (mĭl'ton), JOHN, a famous English poet, the son of John Milton, scrivener, London, was born in the metropolis in 1608; died there in 1674. His father had him carefully educated, and at the age of seventeen he entered Christ's College, Cambridge, where he resided for seven years, took his B.A. and M.A. degrees, and excelled in Latin verse and English composition. It had been intended by his parents that he should enter the church, but their puritanical beliefs and his own scruples regarding the oaths decided otherwise. During this period were written: *On the Death of a Fair Infant* (1625-26); *On the Morning of Christ's Nativity* (1629); *On Shakespere* (1630); *On Arriving at the Age of Twenty-three* (1631); and the *Epitaph on the Marchioness of Winchester*. Leaving the university, he went to reside with his father, who had retired to Horton in Buckinghamshire, and here he remained for the following six years. In this leisured retreat he studied classical literature, philosophy, mathematics and music. To this period belong his Latin hexameters *Ad patrem;* the fragment called *Arcades; L'Allegro* and *Il Penseroso;* the beautiful monody of *Lycidas*, occasioned by the death of his college friend, Edward King; and the pastoral masque of *Comus*, played before the Earl of Bridgewater at Ludlow Castle in 1634. In 1637, on the death of his mother, he made a continental journey, in which he visited Paris, where he was introduced to Grotius; Florence, where he met Galileo; and Rome and Naples. After remaining abroad for fifteen months he returned to England. His *Italian Sonnets* and some other pieces were written during this journey. The home at Horton having been broken up, Milton settled in the metropolis, and undertook the education of his two nephews, the sons of his sister, Mrs. Phillips, and to these, betimes, were added the sons of a few personal friends who boarded or received daily lessons at his house in Aldergate Street. While settled here his *Paradise Lost* was partially sketched out, but the immediate fruits of his pen were (1641–42) vigorous polemical treatises entitled *Of Reformation Touching Church Discipline in England: Of Prelatical Episcopacy; Animadversions Against Smectymnuus; The Reason of Church Government;* and the *Apology for the Animadversions*. In the summer of 1643 Milton married Mary Powell, the daughter of a royalist family. Divided from

her kinsfolk by politics, he was also dissimilar to his wife in age—she being little more than seventeen, while he was thirty-five. Moreover, she found his habits austere and his house dull, with the result that she returned to her father about a month after marriage. Milton quickly made his private trouble a plea for public protest against the marriage laws in his pamphlets on the *Doctrine of Divorce*, *The Judgments of Martin Bucer*, *Tetrachordon* and *Colasterion*. In the end, however, his wife returned in 1645, bore him three daughters, and continued to live with him until her death in 1653. Besides his pamphleteering he was at this time occupied in publishing the first edition of his *Minor Poems in Latin and English* (1645), with no apparent recognition of his claims as a poet. In connection with his divorce pamphlets he was prosecuted by the Stationers' Company for having published them without license or registration. His answer to this was the famous *Areopagitica*, a speech for the liberty of unlicensed printing, which he addressed to the parliament of England. When in 1649 Charles I was executed and a republic established, Milton avowed his adherence to it in his pamphlet *Tenure of Kings and Magistrates*, and was appointed foreign (Latin) secretary to the commonwealth. While occupying this position he wrote in 1649 *Eikonoklastes* ('Imagebreaker') in answer to the *Eikon Basilike* (q. v.), and his *Pro Populo Anglicano Defensio* ('Defense of the People of England'), the latter in answer to Salmasius of Leyden, who had vindicated the memory of the late king. In this literary task his eyesight suffered so much that in 1652 he became totally blind. Nevertheless he continued Latin secretary with the assistance of Andrew Marvell, and dictated some of Cromwell's most important despatches. Upon the death of the latter, and in the confusion which resulted, Milton in 1659 wrote his *Ready and Easy Way to Establish a Free Commonwealth*. But when Charles II was restored a few months later, the blind politician remained in hiding, his books were burned by the common hangman, and he himself narrowly escaped the scaffold. He had married a second wife in 1656, who fifteen months after had died in childbirth; in 1663 he married a third time, and began the writing of *Paradise Lost*. This was published in 1667, the publisher agreeing to pay the author £5 down and a further £5 after the sale of each edition of 1300 copies. The published price was three shillings, and the poem was at first in ten books. In two years a second edition, now arranged into twelve books, was printed, and Milton's position as the greatest poet of his time was established. In 1670 there appeared his *History of Britain to the Norman Conquest*, and in the following year the continued vigor of his poetic faculty was shown in *Paradise Regained* and *Samson Agonistes*. In 1674, the last year of his life, he printed his *Epistolæ Familiares* and *Prolusiones Oratoriæ*. His death took place at his house in Bunhill, and he was buried in the church of St. Giles, Cripplegate.

Milton, a town of Norfolk county, Massachusetts, on the Neponset river, 8 miles S. of Boston. Fine granite is quarried here, and there are chocolate and cocoa factories, paper mills, etc. Pop. (1920) 9382.

Milton, a town of Northumberland Co., Pennsylvania, on the west branch of the Susquehanna, 13 miles above Sunbury. It has steel and iron works, car, knitting, and furniture factories, saw and planing mills, nail and nut and bolt works. Pop. (1920) 8638.

Miltwaste. See *Scale-fern.*

Milwaukee (mil-wą'kē), chief city and port of Wisconsin, on the west shore of Lake Michigan, which here receives the united rivers Milwaukee, Kinnickinnie and Menominee. The chief residence portion of the town occupies a high bluff overlooking the lake, above the busy valleys along the streams. Among the chief public buildings of the city are the federal building, court-house, city hall, post-office, two cathedrals, art gallery, free library and museum. The harbor is one of the best on the great lakes, and the largest vessels can come directly to the warehouses. Its transportation facilities have made Milwaukee one of the chief manufacturing and commercial centers of the lake region, the chief articles of its large commerce being grain, coal, flour and lumber. It has great iron and steel plants, machinery shops, engine factories, locomotive and car works, saw mills, rubber tire plants, packing plants, leather, malt, farm implement and other factories. Pop. (1900) 285,315; (1910) 373,857; (1920) 457,147.

Mimbar (mim'bär), the pulpit in a mosque. See *Mosque.*

Mime (mim), a kind of dramatic performance common among the ancient Greeks and Romans. Mimes appear to have originated among the Greek colonists of Southern Italy, and consisted first of extemporary representations at festivals of ludicrous incidents of common life, but were afterwards more artistically developed. The Roman mimes

were not unlike modern pantomime, but frequently indecent.

Mimeograph (mim'ē-u-graf), an instrument by which copies of any document may be transcribed and multiplied, through the use of a stencil made of thin paper prepared with paraffine or similar substance, which is put upon an ordinary typewriting machine, and receives the impression of the letters in the ordinary way.

Mimicry (mim'ik-ri), in biology, the name given to that condition or phenomenon which consists in certain plants and animals exhibiting a wonderful resemblance to certain other plants or animals, or to the natural objects in the midst of which they live. This peculiar characteristic is generally the chief means of protection the animal has against its enemies. It is well seen in the leaf-insects (Phyllium), also in the 'walking-stick' insects (Phasmidæ). Certain tropical butterflies reproduce the appearance of leaves so closely that even the parasite fungi which grow upon the leaves are imitated. So also a South American moth has a most accurate resemblance to a humming-bird; while the cacti of America and the euphorbias of Africa might easily be mistaken for each other, though widely different in structural characters. The theoretical explanation of this mimetic quality is attributed by recent biologists to purposes of self-preservation. Thus, the form or color which enables an animal to seize its prey easily and to protect its own life by deceptive resemblance to other objects, is conceived to be that form and color which is most likely to aid in its survival. The term is used in a merely metaphorical sense, and implies no act of volition on the part of the animal or plant, being simply a result of natural selection.

Mimnermus (mim-ner'mus), an ancient Greek poet and musician, who was probably born at Smyrna, and flourished from about 630 to 586 B.C. His poems were burned by the Byzantine monks, and only a few fragments belonging to a poem called *Nanno* have come down to us.

Mimosa (mi-mō'sa), a genus of leguminous plants, type of the subdivision Mimoseæ. See *Sensitive Plant*.

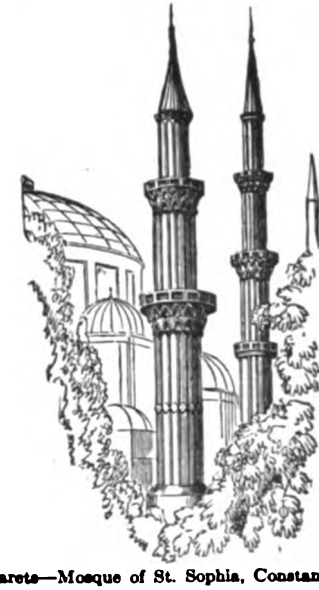
Mimulus (mim'u-lus), a genus of plants, nat. order Scrophulariaceæ. There are about forty species, natives of extratropical and mountainous regions of Asia, Africa, Australia and America. They have often handsome red, yellow, or violet flowers. *M. moschātus* is the musk plant of gardens. Others are favorite flowers.

Mimusops (mi-mū'sops), a genus of large, milky-juiced tropical trees common to both hemispheres. See *Bullet-tree*.

Mina (mī'na), among the Greeks, a weight of 100 drachmæ; also, a piece of money valued at 100 drachmæ. The Attic mina (sixty of which make a talent) was about $20, the Æginetan mina, $23.40.

Mina Bird. See *Grakle*.

Minaret (min'a-ret), a slender lofty turret rising by different stages or stories, surrounded by one or more projecting balconies, commonly attached to mosques in Mohammedan countries, and frequently of very elegant design. Minarets are used by the priests for summoning from the balconies the people to prayers at stated times of the day; so that they answer the purpose of belfries in Christian churches.



Minarets—Mosque of St. Sophia, Constantinople.

Minas Geraes (mē'nas je-rā'es), the most populous province of Brazil, bounded by Bahia, Espirito Santo, Rio de Janeiro, Sao Paulo and Goyaz; area, 221,861 square miles. It forms a high plateau varied by hills, and the climate is temperate and healthy, except along the swampy riversides. It is

rich in minerals; sugar-cane, cotton, millet, tobacco, and coffee are cultivated; timber is abundant. The chief town is Ouro-Preto. Pop. 3,594,471.

Mincio (min'chō; *Mincius*), a river of Italy, which flows from the south extremity of Lake Garda, and after forming the lake and marshes that surround Mantua falls into the Po, 8 miles below the city. The length of its course is 42 miles.

Mind (mīnd), a term that admits of no exhaustive scientific definition, but may be said to indicate, generally, the power possessed by each of us in virtue of which we know, think, feel and will. Limited to the individual, and varifiable only through individual experience, its phenomena have long been held to represent the immaterial as distinguished from the material world, *mind* and *matter* forming thus a direct antithesis. Yet we have no experience of mind as apart from matter, and many, instead of regarding mind as a separate entity, hold it rather to be akin to some function of the nervous system. The mental powers or functions are generally classed as three—intellect or understanding, emotion or feeling, and volition or will. Sometimes the term mind is specially given to the first (the intellect), which itself possesses several powers or capacities, such as perception, memory, reasoning, imagination. It is by the intellect that we acquire knowledge, investigate phenomena, and combine means to ends, etc., but the ultimate analysis of our mental powers gives different results with different investigators, the classification of the faculties of the mind being thus very various. The science that has specially to do with the investigation of mental phenomena is generally known as psychology. See also *Emotion*, *Imagination*, *Will*, etc.

Mindanao (mēn-da-nä'ō), one of the Philippine Islands, next to Luzon in point of size, about 300 miles long and 105 broad; area, 36,292 sq. miles. The Americans occupy the north portion of the island, the remainder being under native rulers, of whom the Sultan of Mindanao is the chief. All the country, except upon the seacoast, is mountainous, the volcano of Apo being 8819 feet high. Some coffee, cocoa and cotton are exported. The chief town is Zamboanga or Samboangan, a port and naval station at its western extremity. Pop. (1915 estimate) 560,000.

Minden (min'den), a town of Prussia, Westphalia province, on the Weser. Here the French were defeated (1759) during the Seven Years' War. Pop. 26,454.

Minden, parish seat of Webster Parish, Louisiana, 30 miles E. of Shreveport, in a cotton, corn and sugar district. Pop. (1920) 6105.

Mindoro (mēn-dō'ro), one of the larger of the Philippine Islands, situated south of Luzon, from which it is separated by the Strait of Manila; about 110 miles long by about 53 broad. It is evidently volcanic, the climate is hot, and the rain almost incessant. Rice, cacao and wild cinnamon are among the products. Pop. 28,361.

Mine (mīn), in military language a subterranean passage dug under the wall or rampart of a fortification, or under any building or other object, for the purpose of blowing it up by gunpowder or other explosive. What are called *submarine mines* are now used in the defense of places liable to attack from a naval force. Such a mine consists of a charge of some powerful explosive inclosed in a suitable case, which is anchored at the bottom of the water, or at a suitable depth, and may be exploded at will by means of electricity so as to blow up a hostile vessel, or the mere contact of a vessel may cause it to explode. In ordinary language a mine is a pit or deep excavation in the earth, from which coal, metallic ores, and other mineral substances are taken. The pits from which stones are taken are called *quarries*. See *Mining*.

Mineralogy (min-er-al'o-ji), the science which treats of the properties of mineral substances, and teaches us to characterize, distinguish, and classify them according to their properties. It comprehends the study or science of all inorganic substances in the earth or on its surface. As distinguished from geology, mineralogy deals with the various mineral bodies as separate constituents of the earth's crust, and examines their properties as such, while geology treats them in the aggregate, as building up the crust of the earth, and as forming masses and presenting phenomena that have a history to be investigated. Minerals may be described and classified either in accordance with their chemical composition, their crystallographic forms, or their physical properties of hardness, fracture, color, luster, etc., or a combination of all, and thus various systems of classification have been adopted. Most minerals crystallize in definite forms, and this form is one of the chief characteristics of many mineral species. There are not a few, however, which are not distinctly crystalline, but are earthy or occur in masses; the latter exhibiting important varieties of structure, as *laminated*, *fibrous*, *granular*, *reniform*, *botryoidal*, etc.

Other distinctive characteristics are *color*, which, however, varies even in the same mineral; *luster*, the character of the light reflected from the surface, and described as *adamantine*, *vitreous*, *nacreous*, *greasy*, *silky*, etc.; *fracture*, or the character of the freshly-broken surface; *streak*, or the appearance and color of a furrow made in the mineral by a hard-tempered knife or file; and *hardness*, which is now determined by what is called Mohs' scale. In this scale certain minerals are represented by numbers from 1 to 10, viz. (1) *talc*, common laminated light-green variety; (2) *gypsum*, a crystallized variety; (2.5) *mica;* (3) *calcite*, transparent variety; (4) *fluorspar*, crystalline variety: (5) *apatite*, transparent variety; (5.5) *scapolite*, crystalline variety; (6) *potash feldspar*, white cleavable variety; (7) *quartz*, transparent; (8) *topaz*, transparent; (9) *corundum;* (10) *diamond*. To determine the hardness of a mineral, it is ascertained by experiment which of these it will scratch and which will scratch it; thus if a mineral will scratch fluorspar but not apatite, while the latter will scratch it, its hardness is between 4 and 5. Hardness is often one of the most conclusive tests in identifying minerals by their physical properties. Diaphaneity, refraction, polarization, electric properties, etc., are all distinguishing marks. In the classification of minerals, their chemical composition, though not to be regarded by itself, is of much importance. Among famous names in connection with mineralogy may be noted those of Werner, Hatly, Mohs, Dana, etc.

Mineral Tallow, or *Hatchettine*, a substance found in several places in Germany, Siberia, etc. It is soft and flexible, yellowish, resembling wax or tallow, often flaky like spermaceti, and composed of about 86 per cent. carbon and 14 per cent. hydrogen. The mineral is closely related to, if it be not identical with, native paraffine. Like other hydrocarbons, such as naphtha, petroleum, asphalt, etc., it appears to have resulted from the chemical alteration of organic matter.

Mineral Waters, is the term commonly applied to the spring waters that contain an unusual quantity of such substances as sodium, magnesia, iron, carbonic acid and sulphur; but it cannot be used in any absolute fashion. The most popular European springs are those of Aix-la-Chapelle, Wiesbaden, Baden-Baden, Carlsbad, Ahrweiler (Apollinaris), Friedrichshall, Buda-Pesth (Hunyadi-Janos), Vichy and Bath. There are many also in the United States, as at Saratoga, New York, in Arkansas, Virginia, Pennsylvania, and other States. The waters are usually drunk at an early hour before breakfast, and the curative effects are greatly aided by early rising, moderate exercise, mental relaxation, and complete freedom from all kinds of excess. It has not been found practical or useful to classify mineral waters under their chemical elements, but the attempt has been made, as where the springs are described as—salt, earthy, sulphur, iron, alkaline and alkaline-saline. Besides the substances which these terms indicate, the waters are frequently impregnated with carbonic acid gas, which is found to aid digestion while giving a pleasant stimulus to the general system.

Mineral Wells, a city of Palo Pinto Co., Texas, 55 miles N. W. of Fort Worth; noted for its mineral springs. Pop. (1920) 7890.

Mineral Wool, a substance which is produced from the vitreous liquid slag of a blast furnace drawn out into fine fibers under pressure of steam. The slag, when in a molten condition, is driven by the steam from the furnace through a crescent-shaped aperture, and suddenly cools into long fibrous filaments. The thin, glassy, threadlike substance thus produced is useful as a non-conductor of heat, and it has, therefore, been largely employed as a covering for boilers and steam pipes, to prevent the freezing of water in pipes, etc.

Minersville, a borough of Schuylkill Co., Pa., on Schuylkill River. Has coal mines. Pop. 7845.

Minerva (mi-nĕr'va), a daughter of Jupiter, and one of the great divinities of the ancient Romans. She was looked upon as the patroness of all arts and trades, and her annual festival, called Quinquatrus, lasted from the 19th to the 23d of March inclusive. This goddess was believed to protect warriors in battle, and to her was ascribed the invention of numbers, and of musical instruments, especially wind-instruments. At Rome a temple was built for Minerva by Tarquin on the Capitol, where she was worshiped along with Jupiter and Juno; and there was also a temple on the Aventine dedicated to herself alone. This deity is supposed to be of Etruscan origin, and her character has much in common with the Greek goddess Athena (which see).

Mingrelia (min-grē'li-a), a district of the Caucasus, in Russia, since 1867 part of the province of Kutais; area, 2100 square miles. The Mingrelians are closely related to the Georgians. The country in this region is mountainous but fertile, and the chief products are corn, wine, oil, etc. Pop. 241,000.

Minho (mĕn'yō), more fully ENTRE DOURO E MINHO, a province of Portugal, bounded on the north by the river Minho, south by the Douro, and west by the Atlantic; area, 2706 square miles. The surface is generally mountainous. The most important products are wine, flax, cork and oranges. Pop. 1,173,106.

Minho, a river of Spain and Portugal, in the northwest angle of the peninsula; length, 130 miles.

Miniature (min'i-tūr), a small painting, especially a portrait, executed with delicate care, chiefly upon ivory, also upon vellum, paper, etc. The term is from the Italian *miniatura*, originally applied to a small painting, such as those formerly used to adorn manuscripts, from the common use of *minium* or vermillion in the ornamentation of the illuminated manuscripts in the middle ages. The art of miniature painting was carried to its highest perfection, chiefly in France, during the eighteenth century,

Minim (min'im), in music, a note equal in duration to one-fourth of a breve, and one-half of a semibreve.

Minim Friars, or MINIMS (from L. *minimus*, least), an order of reformed Franciscans, founded by St. Francis of Paula in Calabria in 1473. Their dress is black, and, like that of the Franciscans, provided with a scourge. They belong to the mendicant orders, and possessed, in the eighteenth century, 450 converts in thirty provinces.

Minimum Thermometer, a self-registering thermometer marking the lowest fall of the mercury. See *Thermometer*.

Mining (min'ing), is the term applied to the underground engineering process by which minerals are excavated and brought to the earth's surface. That this process in a rude form was known to the ancients is shown by references in the book of Job, the records of the Phœnicians and Egyptians, and the signs of supposed Roman excavations found in Britain. The first important historical record of mining operations in England is found in the charter to dig for coals, granted in 1259 by Henry III to the freemen of Newcastle-on-Tyne. Then, again, in the reign of Henry VII a commission was empowered to dig and search for metals; while during Elizabeth's reign German miners were induced to visit England, and extensive privileges granted to the 'Society of Mines Royal.'

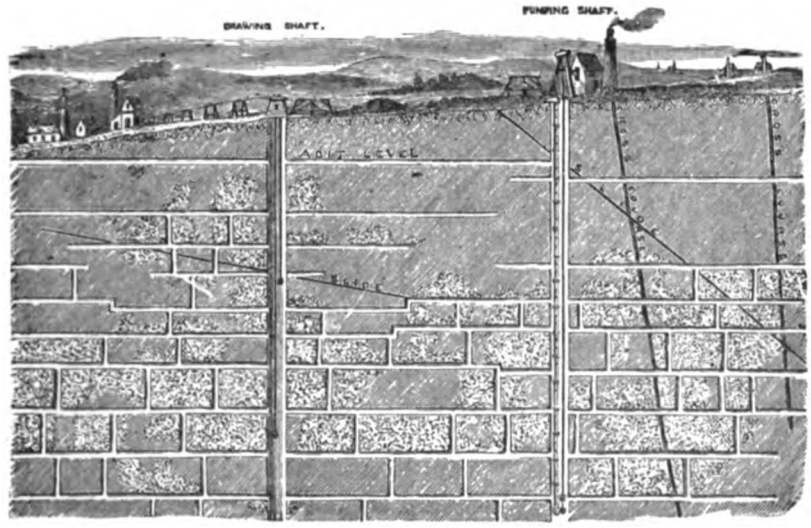
Begun thus early, the development of mining has been greatly advanced by the introduction of gunpowder and dynamite for blasting purposes; by the use of steam engines for pumping water from the mine and bringing material to the surface; and by the aid of improved ventilation, which now enables mines to be carried to deeper levels. In describing the modern methods of mining it is found convenient to draw a distinction between metal and coal.

Metalliferous mining has to deal with a mineral which is found in *lodes* or *veins* irregularly imbedded in rock fissures, the trend of which is uncertain and the thickness variable. In preparing to excavate this irregularly distributed mineral two shafts are sunk in the vicinity of the lodes, one of which is used for pumping and ventilating the mine, the other for drawing the material to the surface. From these two shafts horizontal galleries are driven at distances of 10 or more fathoms apart, an additional gallery being driven at intervals of 10 or 15 fathoms as the mine is increased in depth. The galleries are driven as far as possible on the course of the lode, and if the lode is going down on a slope, the galleries in such case are not vertical above one another. These galleries are connected by vertical passages or 'winzes'; and in this way they are ventilated, and the material to be excavated is divided into rectangular blocks. The metal ore after being excavated is broken up by the miner, put into a barrow, wheeled to one of the main galleries, thence transported in cars drawn on rails by men, mules, or engines, to the main shaft. There it is hoisted to the surface in an iron 'kibble' or a wooden 'skip' which travels up and down in guides fixed to the side of the shaft.

Access to many metalliferous mines is still obtained by means of ladders fixed almost vertically in the sides of the shaft. This toilsome method is averted in some mines by what is called a 'man-engine,' which consists of two rods with platforms attached which move up and down reciprocally the distance between two platforms, the miner ascending or descending from the platform of one rod to that of another alternately. Besides the shafts there is usually an entrance to the mine called an 'adit' or 'day-level' which is driven straight into the mine from the nearest convenient depression or valley and is mainly used for purposes of drainage. Adits are sometimes of great length.

Coal mining has to deal with a mineral which is deposited in *seams* or *beds*, sometimes nearly horizontal, at other times nearly vertical. These seams are interstratified with layers of sandstone, shale, clay, etc., and when the beds are tilted the coal has been frequently found

outcropping at the surface. In the chief coal fields this outcrop coal has been exhausted, and it is now found necessary to approach the coal seams by means of shafts, of a rectangular or circular shape, sunk into the earth. Before sinking the shaft it is expedient to bore down through the strata in order to test the thickness and direction of the coal-measures. The bore-hole is usually begun by digging a small pit about 6 feet deep, and the old method was to pierce the rock by means of a cutting tool attached to long rods and worked by a lever with hand-power. Various improvements on this slow method have recently been made, as where hydraulic or steam power is used to drive the boring-rods, and diamond drills employed instead of the steel tool. (See *Boring.*) When this boring test has been found satisfactory the shaft is then sunk. One shaft not unfrequently intersects a number of workable coal-seams, these being generally separated by shale, sandstone and limestone. Seams of coal vary in thickness from 2 inches up to 30 feet or even much greater. The coal having been reached, the mining engineer has to devise the safest and most economical method of cutting the coal and sending it to the surface. There are two commonly adopted methods of working out coal-seams, viz., the 'pillar-and-stall' or 'stoop-and-room' system, and the 'long-wall' or 'longwork' system. The former method consists in excavating 'rooms' in such a manner as to divide the coal into rectangular pillars or 'stoops.' In the early days of coal-mining the stalls were made large and the upholding pillars left small, no attempt being afterwards made to recover the coal in these pillars. When the floor of the mine was of soft clay or lime the weight of the roof drove the pillars down, causing the floor to rise in the center between the pillars, and establishing an undulating movement throughout the underlying strata called by miners 'the creep.' To prevent this the coal is now left in wide barriers or 'pannels' which divide one part of the workings from another. The pillars of coal which are now left are recovered by a second operation, which consists in cutting them out after a division or pannel has been excavated to its boundary, or by working them out when the stills have been driven the length of two or three pillars. These pillars are, in most cases, about 20 yards square, and in one pannel of the mine there are often 600 such pillars. In the 'longwall' method the miner cuts into, or 'holes' into, the underpart of the coalbed for two or three feet, and then, with the aid of wedges driven in atop, he loosens and extracts the mass of



SECTION OF PART OF THE DEVON GREAT CONSOLS COPPER MINE.
The parts lightly shaded indicate where the mineral has been removed.

coal which has been 'holed.' By this system the entire coal-seam is at once extracted, while the empty space or 'goaf' is filled in with waste material as the work advances. Timbers are also largely used to sustain the roof of mined-out chambers and replace coal pillars when removed, and the quantity of timber thus used in the mines of the United States forms one of the large strains on our forest resources, the mine timbers annually used being estimated at about two and a half billion feet.

One of the most important matters connected with coal mining is *ventilation*. To facilitate this there are two openings into the mine, which are technically called the 'intake' and 'return' air-passages. The necessary supply of pure air is maintained either by the natural heat of the mine causing a constant inrush of cold air; by pumps or fans forcing the air down the 'downcast' shaft or drawing it up the 'upcast' shaft; or by furnace ventilation. This latter mode is considered the most efficient. The furnace by its heat causes a constant current up the upcast shaft, thus drawing the vitiated air away from the workings. Connected with ventilation is the dangerous accumulation of fire-damp, which may take place in a mine, to guard against which safety-lamps have been introduced. See *Fire-damp*, *Safety-lamp*.

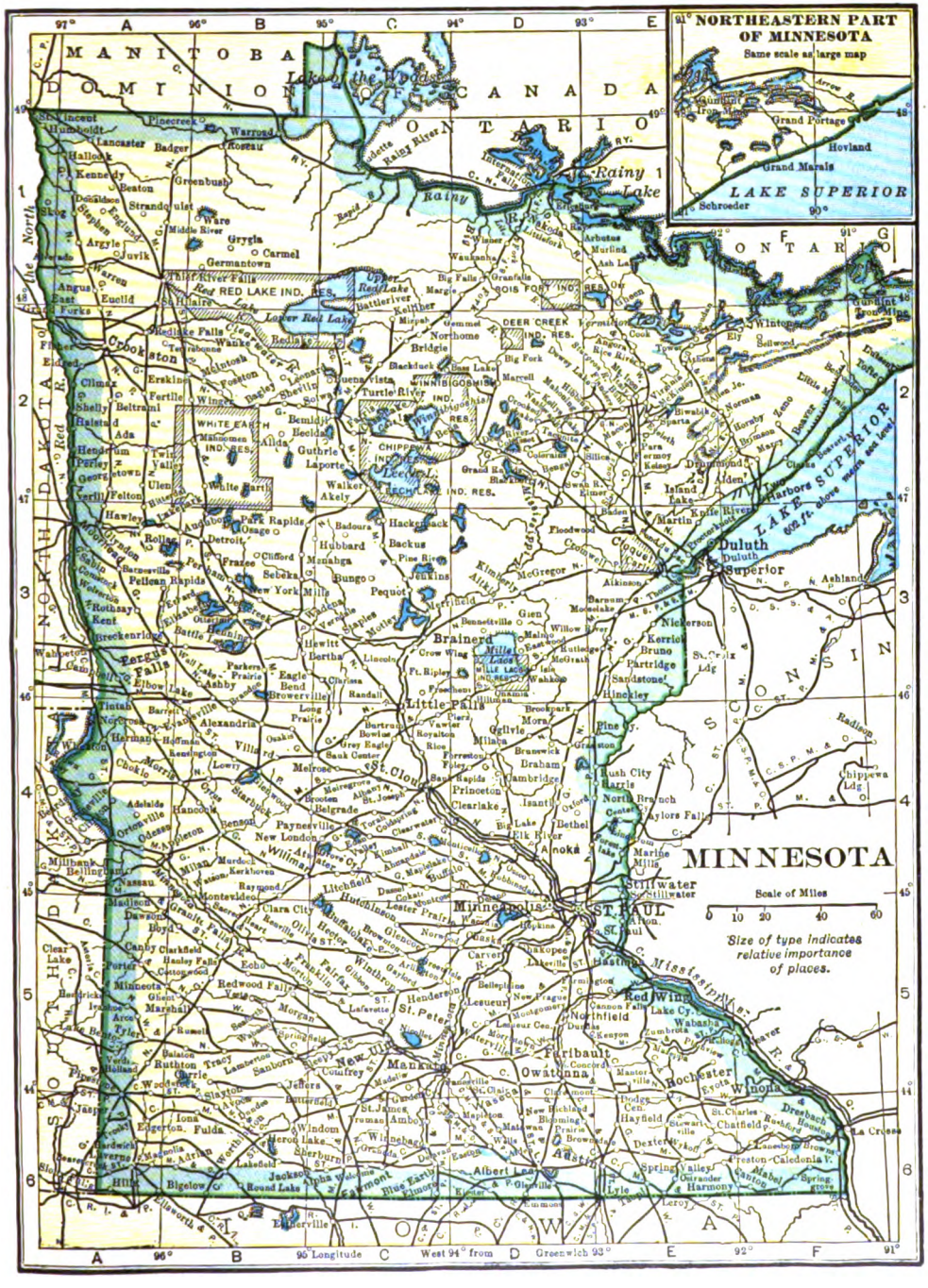
The pumping of water out of the workings is an essential part of mining, surface water often seeping in, in large quantities. Some of the largest pumping engines raise from 2000 to 3000 gallons of water per minute.

Minion (min'yun), a size of type between brevier and nonpareil. See *Printing*.

Minister (min'is-tèr), a designation in general use in the United States (and less widely in Britain) applied to a preacher or clergyman.

Ministers (min'is-tèrz), the name applied in politics to the chief servants of a state in the administration of its affairs, and the chief representatives of a country at a foreign court. (See *Ministers, Foreign.*) In Britain the former are known collectively as the *ministry*, and the head of the administration is called the *prime minister* or *premier*. The number of ministers who hold cabinet rank varies in different administrations, but it invariably includes the first lord of the treasury, lord chancellor, lord president of the council, the secretaries of state for home, foreign, war, colonial and Indian affairs, the chancellor of the exchequer, and the first lord of the admiralty. (See *Cabinet*.) All the ministers are appointed by the prime minister, subject to the approval of the crown. When an appointment as minister with emoluments is accepted by a member of the House of Commons he must vacate his seat and seek reëlection; but when he merely moves from one ministerial office to another no reëlection is necessary. The ministry, including the officers of the household, number nearly seventy persons, most of whom receive salaries. When the ministry is defeated in the House of Commons on an important question of policy it is customary for the prime minister to tender his resignation to the sovereign, or crave leave to appeal to the country. Should the decision of the House of Commons be endorsed by the country at a general election it is usual for ministers to resign, to admit of another administration being formed before the new Parliament meets. On the resignation of a ministry it is usual for the sovereign to send for the leader of the opposition, who is asked to form a ministry in place of that which has resigned. No such institution exists in the United States, but a responsible premier and ministry exists in various European nations, similar to that of Britain. The American diplomats abroad all formerly bore the title of Minister, but those sent to the leading countries are now known as ambassadors. There is no official in the United States similar to the European premier or prime minister.

Ministers, Foreign, are those accredited representatives which one country sends to another. Generally they are divided into three classes. The highest in rank is the *ambassador extraordinary*, who can claim to represent his state or sovereign in his own person, and receive honors and enjoy privileges accordingly. The *legates* and *nuncios* of the pope also belong to this class. *Envoys extraordinary*, *internuncios*, and *ministers plenipotentiary* belong to the second class, and neither hold the same degree of power nor receive the same distinction as the former. The third class includes *ministers resident*, *envoys* and *chargés d'affaires*, the last being sometimes regarded as a fourth class. Persons who are sent merely to conduct the private affairs of their monarch or his subjects in a foreign place are called *agents* or *residents*; and where they are occupied chiefly with subjects of a commercial character such as reporting trade conditions, they are called *consuls*. When the foreign minister is accredited directly to the sovereign of a state he is considered inviolable, and he is freed


NORTHEASTERN PART OF MINNESOTA
Same scale as large map
Grand Portage
Hovland
Grand Marais
LAKE SUPERIOR
Schroeder
MANITOBA
DOMINION OF CANADA
ONTARIO
Lake of the Woods
Rainy Lake
Rainy River
RED LAKE IND. RES.
Lower Red Lake
Upper Red Lake
LEECH LAKE IND. RES.
WHITE EARTH IND. RES.
DEER CREEK IND. RES.
FOND DU LAC IND. RES.
NETT LAKE IND. RES.
BOIS FORT IND. RES.
Lake Superior
602 ft. above mean sea level
NORTH DAKOTA
SOUTH DAKOTA
WISCONSIN
IOWA
MINNESOTA
Duluth
Superior
Minneapolis
ST. PAUL
Brainerd
Little Falls
St. Cloud
Fergus Falls
Mankato
Austin
Albert Lea
Rochester
Winona
Red Wing
Stillwater
Anoka
Hastings
Faribault
Owatonna
Northfield
Lake City
Wabasha
Scale of Miles
0 10 20 40 60
Size of type indicates relative importance of places.
Longitude
West 94° from Greenwich
97° A
96° B
95° C
94° D
93° E
92° F
91° G
49°
48°
47°
46°
45°
44°

from taxes and territorial restrictions. See *Ambassador, Envoy, Consul.*

Minium (min'i-um), the red oxide of lead, often designated *red lead*, and commonly used as a pigment for ordinary purposes.

Mink, a species of the weasel family (*Mustela vison*), inhabiting the north temperate and sub-arctic zones of both continents. It is semi-aquatic, largely nocturnal, wanders extensively, and feeds largely upon fish and also on birds, small mammals, frogs and cray fishes. It also destroys poultry. The length is about 28 inches, and the color generally deep brownish-black. The fur of the mink is of great value commercially.

Minneapolis (min-nē-ap'o-lis), the largest city of Minnesota, county seat of Hennepin Co., on both banks of the Mississippi, at the Falls of St. Anthony, immediately above the city of St. Paul, the suburbs of the two cities meeting. It is regularly laid out with broad streets from 80 to more than 100 feet wide. Five large natural lakes and a number of small ones, within the city limits, give Minneapolis the basis of a park system of surpassing beauty and utility. Lake Minnetonka is one of the most popular of the nearby resorts. Among the many objects of interest in the city may be mentioned the Institute of Arts, Court House and City Hall, Fort Snelling, State Agricultural College, University of Minnesota, etc. With its State University, and notable private educational institutions, its art galleries, its Symphony Orchestra, its Municipal Band and various other agencies devoted to educational and civic activities it is the recognized cultural center of the Northwest as well as its commercial center. It is the world's chief flour manufacturer. The capacity of its flour mills is 99,860 barrels daily. Flour shipments have exceeded 18 million barrels annually. In linseed products Minneapolis stands first; in fruit and produce distribution, third. Its annual manufacturing and wholesaling output reaches over $1,340,000,000. Twenty-nine railway lines radiate from the city; among these are the Burlington Route, Great Northern, Northern Pacific, Chicago, Rock Island and Pacific, Chicago and Northwestern, Chicago, Milwaukee and St. Paul, Minneapolis, St. Paul and Sault Ste. Marie, and many other railroads. The river here falls about 80 feet, furnishing immense water power. Flour and lumber are the chief manufactures. Pop. (1910) 301,408; (1920) 380,582.

Minnesingers (min'e-sing-ėrz; O. Ger. *Minne*, love), a class of German lyric poets of the twelfth and thirteenth centuries, so called from love being the chief theme of their verse.

Minnesota (min-nē-sō'ta), one of the United States of America, bounded north by Canada, east by Lake Superior and Wisconsin, south by Iowa, and west by the Dakotas; area, 84,682 sq. miles. The chief towns are Minneapolis, and the capital, St. Paul. This state occupies the summit of a central plateau formed by the coterminous basins of the Mississippi, the St. Lawrence and Lake Winnipeg. The surface is generally an undulating plain, with a general slope southeast towards the basin of the Mississippi, which, with its affluents, drains about two-thirds of the State. The Red River of the north, which forms part of the west boundary, also receives a part of the drainage, and part is carried by Rainy Lake River to the Lake of the Woods, part to Lake Superior. Lakes are numerous, including Leech Lake, Red Lake, Vermilion Lake, Mille Lacs, and part of Lake of the Woods and Rainy Lake. Iron and copper are among the chief minerals, the iron yield of the Lake Superior region being very large. Peat is seemingly inexhaustible in some parts of the State, and is used to some extent as fuel. Building stones include granite, gneiss, limestone, etc. In this State is the red pipestone deposit, formerly used by the Indians for their pipes. The soil for the most part is good, and the Red River valley is considered the finest wheat-growing district in the State. A large forest known as the 'Big Woods' extends over the center of Minnesota for the length of 100 miles and a breadth of 40 miles, and the country, especially above lat. 46°, is well wooded with pine, spruce, oak, beech, elm, maple, while the prairies have been planted with 20,000,000 trees by the aid of State bounties. The climate is on the whole excellent, the winters, though cold, being clear and dry. Minnesota has a great diversity of valuable natural resources. Its iron-ore deposits are the richest in the country; in 1918 it ranked third among the states in the production of wheat; and its timber lands are extensive. The iron mines do not contribute directly to the state's manufactures, because the ore is shipped to eastern blast furnaces. The wheat fields and forests, however, furnish the raw materials for the two most important industries of the state. Other industries are meat packing, dairying and foundry and machine shops. The transportation facilities, both rail and water, are excellent. By the State constitution a por-

tion of land is set apart in each township to provide a perpetual education fund. The State University (8275 students) is at Minneapolis. Minnesota became part of the United States in 1783; the Indian title to its lands was extinguished in 1838; organized as a territory, 1849; admitted into the Union, 1858. Pop. (1900) 1,751,394; (1910) 2,075,708; (1920) 2,387,125.

Minnesota River, a river in the United States, which flows through Minnesota and falls into the Mississippi 5 miles above St. Paul; length, 470 miles.

Minnow (min'ō; *Leuciscus phoxinus*), a species of fish belonging to the same genus as the carp. They swim in shoals, seldom exceed 3 inches in length, and make excellent bait for trout. In the United States various small fish receive this name.

Mino Bird. See *Grakle.*

Minor (mī'nur), a person of either sex under age, who is under the authority of his parents or guardians, or who is not permitted by law to make contracts and manage his own property. See *Age.*

Minor, in music. See *Major.*

Minorca (mi-nor'ka; Spanish, *Menorca*), an island in the Mediterranean, belonging to Spain, the second largest of the Balearic group; area, 260 sq. miles. It is situated E. N. E. of Majorca, from which it is separated by a strait 27 miles broad. The surface is mountainous, the coast rugged, and the best harbor is at Port Mahon, the capital of the island. Mount El Toro, in the center, attains the height of about 5000 feet. The soil is not generally fertile, yet a considerable quantity of wheat, oil, wine, hemp, flax, oranges, etc., are produced. Iron, copper, lead and marble are plentiful. During the greater part of the eighteenth century Minorca belonged to the British, who finally ceded it to Spain at the Peace of Amiens (1802). Pop. 41,939.

Minorites. See *Franciscans.*

Minor Planets. See *Asteroids* and *Planets.*

Minor Prophets, THE, so called from the brevity of their writings, are twelve in number, viz., Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah and Malachi. Their prophecies are found in the Hebrew canon.

Minos (mī'nos), in Greek mythology, a ruler of Crete, said to have been the son of Zeus and Europa, and a brother of Rhadamanthus. During his lifetime he was celebrated as a wise lawgiver and a strict lover of justice, and after his death he was made, with Æacus and Rhadamanthus, one of the judges of the infernal world.

Minot (mī'not), a city, county seat of Ward County, North Dakota, situated on the Mouse River. It is a shipping point for grain and coal. Pop. (1920) 10,476.

Minotaur (min'u-tar), in Greek mythology, a monster fabled to have had the body of a man with the head of a bull, and to have fed on human flesh, on which account Minos shut him up in the labyrinth of Dædalus, and at first exposed to him criminals, but afterwards youths and maidens yearly sent from Athens as a tribute. He was slain by Theseus.

Minsk, a town of Russia, capital of government of same name, on the Svislotch, 468 miles by rail S. W. of Moscow. It is the see of a Greek archbishop and of a Roman Catholic bishop, and contains two castles. It has some manufactures and a considerable trade. Pop. 105,000.—The government, which has an area of 35,293 sq. miles, has extensive forests and great stretches of marsh or swamp. Pop. 2,963,700.

Minster (min'stér), anciently the church of a monastery or convent, afterwards a cathedral, as York Minster.

Minstrel (min'strel), a singer and musical performer on instruments. In the middle ages minstrels were a class of men who subsisted by the arts of poetry and music, and sang to the harp or other instrument verses composed by themselves or others. The person of the minstrel was sacred; he was 'high placed in hall, a welcome guest.' So long as the spirit of chivalry existed the minstrels were protected and caressed, but they afterwards sank to so low a level as to be classed, in the reign of Queen Elizabeth, with beggars and vagabonds.

Mint, the name given to several herbaceous aromatic plants of the genus *Mentha*, nat. order Labiatæ. They are nearly all perennial, having square stems which bear opposite and simple leaves; they are widely distributed throughout temperate regions; and they abound in resinous dots which contain an essential oil. Mint has an agreeable odor, and partakes in the highest degree of tonic and stimulating properties. Spearmint (*M. viridis*) is generally used, mixed with vinegar and sugar, in sauce. Peppermint (*M. piperita*) yields the well-known stim-

ulating oil of the same name. Pennyroyal (*M. Pulegium*) is used for the same purposes as peppermint.

Mint, the place where a country's coinage is made and issued under special regulations and with public authority. In England there was formerly a mint in almost every county; the sovereign, barons, bishops, and principal monasteries exercised the right of coining; and it was not till the reign of William III that all the provincial mints were abolished. The present mint on Tower Hill, in London, was erected between the years 1810 and 1815. In former times the coinage was made by contract at a fixed price. The English mint supplies the whole of the coinage of the British Empire, except Australia and the East Indies, which are supplied from branch mints at Sydney, Melbourne, Calcutta and Bombay. In the United States the original mint was established at Philadelphia, and this is still the principal mint, there being others at Denver, San Francisco and New Orleans. See *Coining*.

Minuet (min'ū-et), a slow, graceful dance said to have been invented in Poitou, in France, about the middle of the seventeenth century, performed in ¾ or ⅜ time. The term is also applied to a tune or air to regulate the movements in the dance, or composed in the same time.

Minus (mī'nus), in algebra, the term applied to the negative or subtractive sign —, which, when placed between two quantities, signifies that the latter is to be taken from the former: thus $a - b$ (called *a minus b*) signifies that *b* is to be subtracted from *a*. Quantities which have the sign *minus* before them are called negative of *minus* quantities; as, $-xy$, $-5cd$.

Minute (min'it), a division of time and of angular measure. As a division of time it is the sixtieth part of an hour. As a division of angular measure it is the sixtieth part of a degree. In astronomical works minutes of time are denoted by the initial letter *m*, and minutes of a degree or of angular space, by an acute accent (′).

Minute Men, in the American Revolutionary war, the militia of New England, who were expected to be ready for service at a minute's notice.

Miocene (mī'ō-sēn; Gr. *meiōn*, less, *kainos*, recent), in geology, the name given by Sir Charles Lyell to a subdivision of the tertiary strata, lying between the Eocene and Pliocene. The terms *Miocene* and *Pliocene* are comparative, the first meaning less recent and the other more recent. The Miocene strata contain fossil plants and shells which indicate warm climate. The mammals are important, and foreshadow the animal life of the present day.

Miösen (myes'sen), the largest lake in Norway, about 40 miles N. E. of Christiania. It is 62 miles long and about 9½ miles in greatest breadth, and its waters are carried by the Vormen to the Glommen.

Miquelon (mik-lōn), an island in the Atlantic Ocean, near the southern coast of Newfoundland, belonging to France. The southern part, called Little Miquelon, was once a separate island, but since 1783 has been connected with it by the elevation of a sandbar. The island has been in the possession of the French since 1763. See *Pierre, St.*

Mir, the Russian commune, consisting of the inhabitants of one or more villages, who are as a community owners of the surrounding land, and redistribute the same to the members from time to time.

Mirabeau (mē-rā-bō), GABRIEL HONORÉ RIQUETTI, COMTE DE, a French statesman, son of Victor Riquetti, marquis de Mirabeau, born in 1749 at Bignon, near Nemours; died at Paris, in 1791. At an early age he manifested extraordinary intelligence; but his youth was a stormy and licentious one, so much so that on several occasions he was imprisoned by his father

Mirabeau.

under a *lettre de cachet*. It was during an imprisonment at Vincennes, which lasted three years and a half, that he wrote his *Lettres à Sophie*, *Lettres de*

Cachet and *L'Espion Dévalisé*. On his release from this prison he lived for some time in Holland and England, returning to France in 1785. On the assembling of the states-general in 1789 Mirabeau, elected for Aix, soon became prominent. When the king required the *tiers état* to vote apart from the other two orders it was Mirabeau who counseled resistance, demanded the withdrawal of the troops, consolidated the National Assembly, and defied the king's orders. For some months he continued to lead, but he soon found that the members of the assembly were mostly impracticable and inexperienced men, whose chief function was to discuss an ideal constitution. As a practical statesman Mirabeau desired action, and for this reason he attempted to form alliances with Lafayette, the Duke of Orleans, Necker, and finally with the queen. Correspondence with the latter was maintained through La Marck, and he received a subsidy from the royal party. No practical result followed from this secret alliance, for the queen rejected Mirabeau's counsel and suspected his methods of government. Whether he might ultimately have been able to guide the revolution into peaceful ways has always been a matter of conjecture to historians, but this possibility was prevented by his death in 1791. This was regarded as almost a national calamity, and the people buried him with splendid pomp in the Pantheon.

Mirabilis (mi-rab'i-lis), a genus of plants, nat. order Nyctagineæ, one species of which, *M. jalapa*, is well known in gardens as 'the marvel of Peru.' It is a native of South America.

Miracle (mir'a-kl; Latin, *miraculum*, a wonder, a prodigy; in the original Greek *sēmeion*, a sign, *teras*, a wonder or prodigy), a suspension of, or deviation from, the known laws of nature, brought about by the direct interference of a supreme supernatural being. It is in its nature, as the term implies, an occurrence which is strange, marvelous, inexplicable, and is usually connected with some ulterior moral purpose. By the elder theologians a miracle was conceived to be the triumph of the Divine Will over the work of His hands and the laws of His making. In modern exegesis, however, the miraculous element is not considered to give evidence of opposing forces. On the contrary, a miracle is explained as a manifestation of the Divine Power working through laws and by methods unknown to us, and which, upon a higher plane, are altogether natural and orderly.

Miracle Plays, a sort of dramatic entertainments common in the middle ages, in which the subjects were taken from the lives of saints and the miracles they wrought. They were originally performed in church, but latterly outside, in market-places and elsewhere. In England they were first produced in the twelfth century. They differed from the mysteries mainly in subject. See *Mysteries*.

Mirage (mi-räzh'), an optical illusion, occasioned by the refraction of light through contiguous masses of air of different density; such refraction not unfrequently producing the same sensible effect as direct reflection. It consists in an apparent elevation or approximation of coasts, mountains, ships, and other objects, accompanied by inverted images. In deserts where the surface is perfectly level a plain thus assumes the appearance of a lake, reflecting the shadows of objects within and around it. The mirage is commonly vertical, that is, presenting an appearance of one object over another, like a ship above its shadow in the water. Sometimes, however, the images are horizontal. *Looming* is a phenomenon of the same nature, in which the objects appear to be lifted above their true positions, so that an observer sees objects which are beyond the horizon. The cause is in both cases the same, for while the mirage is produced in most instances by refraction from the desert sand, looming is occasioned by reflection from the sky. The phenomenon called Fata Morgana, which is sometimes seen on the Calabrian coast, is a kind of mirage. By it men and animals apparently of immense size may sometimes be seen presented in the air.

Miramichi (mi-ra-mi-shē'), a bay and river of New Brunswick, Canada. The bay is 20 miles wide at its entrance and runs 21 miles inland. The river falls into the bay after a N. E. course of about 90 miles, of which 40 are navigable for large vessels.

Mirandola (mi-rän'do-lä), Giovanni Pico della, surnamed the *Phœnix*, born in 1463; died in 1494, was the youngest son of Gianfrancesco della Mirandola, of the princely family of Mirandola. He studied at Bologna and at different towns of Italy and France. He had few equals as a finished scholar.

Miribel (mir-i-bel), Marie François Joseph de, soldier, was born at Montbonnet, Department of the Isere, France, in 1831. He was at the siege of Sebastopol, and in the Italian campaign in 1850; served under Bazaine in Mexico, and during the siege of Paris by the

Germans was conspicuous for his gallantry. In 1890 he was made chief of the General Staff of the Army. By the French he was regarded their greatest living strategist. The efficiency attained by their army in recent years is attributed to his masterly direction. He died in 1893.

Mirror (mir'ur), a smooth surface capable of regularly reflecting a great proportion of the rays of light that fall upon it. The mirrors used by the ancients, and more especially by the Etruscans, were made of thin polished bronze, either set in a case or fitted with a handle. Small metal mirrors were also used by the Greeks and Romans, and specimens brought by the latter have been found in Cornwall. In England during the middle ages the gentlewomen carried small circular polished metal mirrors attached to their girdles. These were sometimes also fitted into cases with a lid, the material of which was of gold, silver, or ivory, richly designed and ornamented. The making of glass mirrors, which had their backs silvered with an amalgam of mercury and tin, was early practiced by the Venetians, and by strict prohibitive statutes they were long able to keep their workmen in Venice and enjoy a monopoly of the trade. The manufacture of mirrors of this kind was first introduced into England early in the seventeenth century. The older method of silverizing mirrors by the amalgam of mercury and tin occupied usually a period of weeks, and it has been generally given up. In 1835 Liebig observed that by heating aldehyde in a glass vessel along with an ammoniacal solution of nitrate of silver a coating of brilliant metallic silver was left upon the glass. This has now been made use of in mirror making by what are known as the hot and cold processes. In the hot process the glass is first sensitized with a solution of tin, which is then rinsed off and the plate laid upon a flat, double-bottomed metal table heated by steam to about 100° Fahr. In this position a solution of nitrate of silver, ammonia and tartaric acid in distilled water is poured over it; and if the temperature is kept uniform a thick deposit of silver will be formed in about half an hour. When the silver layer is carefully wiped this process is repeated. In the cold process a solution of nitrate of silver, nitrate of ammonia, and caustic soda dissolved in water is mixed with a solution of loaf-sugar, vinegar and water. This is poured quickly and evenly over the glass plate, and the silver is precipitated in a few minutes, after which it is washed and the process repeated. The silvering is then protected by a coating of shellac or copal varnish. More recently a solution of bichloride of platinum is applied to the surface of the glass and precipitated with oil of lavender in the manufacture of the cheapest mirrors. Mirrors may be plane or spherical, and in the latter case they may be either convex or concave. The optical principles involved in reflection from mirrors are simple.

Mirzapur (mēr-zä'pör), a city of India, capital of a district of same name, in the N. W. provinces, on the Ganges, 56 miles below Allahabad and 45 above Benares, was formerly a place of great trading importance. Pop. 32,332.

Misdemeanor (mis-de-mē'nur), a term applied to all crimes and offenses, whether of omission or commission, less than felony. Misdemeanors are of two kinds—either those which exist at common law, *mala in se*, or those created by statute.

Miserere (miz-e-rē're; Latin, 'have mercy'), the name of a psalm in the Roman Catholic Church service, taken from the fifty-first Psalm, beginning in the Vulgate, '*Miserere* mei, Domine' ('Pity me, O Lord'). The name is also applied to a projecting bracket on the under side of a hinged seat in a stall of a church; or to the seat and bracket together.

Mishawaka (mish-a-wą'kâ), a city of St. Joseph Co., Indiana, on the St. Joseph River, 4 miles E. of South Bend. Its manufactures include gas engines, windmills, rubber and woolen footwear, automobile tires, machinery, etc. Pop. (1910) 11,886; (1920) 15,195.

Mishna (mish'na), a collection or digest of Jewish traditions and explanations of Scripture, preserved by tradition among the doctors of the synagogue, till Rabbi Jehudah, surnamed the *holy*, reduced it to writing about the end of the second century A.D. The Mishna is divided into six parts: the first relates to agriculture; the second regulates the manner of observing festivals; the third treats of women and matrimonial cases; the fourth of losses in trade, etc.; the fifth is on oblations, sacrifices, etc.; and the sixth treats of the several sorts of purification. See *Talmud*.

Misiones (mē-si-ō'nās), a fertile territory of the Argentine Republic, between the Uruguay and Paraná; area, 11,282 square miles. Pop. (1904) 38,775.

Miskolcz (mish'kolts), a town in Hungary, 113 miles northeast of Budapest. The inhabitants are

chiefly employed in agriculture. Pop. (1910) 51,450.

Misletoe. See *Mistletoe.*

Mispickel (mis'pik-el), arsenical pyrites, an ore of arsenic, containing this metal in combination with iron, sometimes found in cubic crystals, but more often without any regular form.

Misprision (mis-pri'zhun), in law, any high offense under the degree of capital, but nearly bordering thereon. Misprision is contained in every treason and felony. *Misprision of felony* is the mere concealment of felony. *Misprision of treason* consists in a bare knowledge and concealment of treason, without assenting to it. Maladministration in offices of high public trust is a *positive misprision.*

Missal (mis'al), in the Roman Catholic liturgy, the book which contains the prayers and ceremonies of the mass. (See *Mass.*) The greater part of these prayers and ceremonies are very ancient, and some of them have come down from the times of the Popes Gelasius I (end of fifth century) and Gregory the Great (end of sixth century); some are even older. The Missal was revised by the Council of Trent, its adoption by the whole Catholic Church demanded by Pius V in 1570, and in this form it is still retained. In England before the Reformation there were missals of the Sarum use, Lincoln use, Bangor use, etc. Before the invention of printing the writing of missals ornamented with illuminated ornaments, initials, miniatures, etc., was a branch of art raised to high excellence in the monasteries.

Missel-thrush. See *Thrush.*

Missing Link, the link between man and the lower animals much sought for, but not yet found. The nearest approach to it lies in the discovery of certain skeletal remains which appear to occupy a place between man and the higher apes. The most significant of these are some fossil bones found by Dr. Dubois in Java in 1891 and named by him *Pithicanthropus.* They consist of a cranium and some other bones, and seem to stand midway between man and the anthropoid apes. While probably human, some doubts of their true position are entertained.

Missions, MISSIONARIES. The first Christian missionaries were the apostles, and by them and their successors Christianity was in the course of a few centuries spread over all parts of the Roman Empire. In some parts, as in Britain, it gave way again before the Germanic invaders of the fifth and sixth centuries, and some of the most noted missionaries were those who reintroduced their faith among the German tribes. St. Augustine or Austin, who was sent by Gregory the Great with forty associates to preach the gospel among the Saxons of Britain at the end of the sixth century, was the first of this missionary group. Britain in its turn sent forth missionaries, such as St. Boniface, 'the apostle of Germany.' Germany also sent out the missionaries who converted Denmark, Sweden and Norway, Poland, Hungary and Bohemia. The Crusades opened up new spheres for missionary efforts in the East, and two religious orders founded at the beginning of the thirteenth century, the Dominicans and Franciscans, devoted themselves to preaching among the Mussulmans. Others advanced as far as Tartary, Tibet and China, but the persecutions there became so violent that those countries had to be abandoned. A new impulse was given to missions by the discovery of the New World. When the way had been prepared by the Spanish and Portuguese armies a crowd of friars of all orders set out for the West Indies, Mexico, Peru and Brazil, to spread Catholicism; but very few, like Las Casas, protected the natives from rapacity or preached Christianity by their conduct. The powerful order of the Jesuits, which was founded in the sixteenth century, turned their attention to the East, and the celebrated Francis Xavier, a member of the order, proceeded to India, where his efforts were crowned with success. From India Christianity was introduced into Japan, where it had to contend against terrible persecutions, before which the missionaries were compelled to retire. Father Ricci, another Jesuit, penetrated to Peking, and succeeded about the end of the sixteenth century in gaining a firm footing. At the beginning of the seventeenth century some Dominican missionaries made Tonquin and Cochin China the center of their efforts, and pushed out thence into all the neighboring countries with considerable success. In 1622 Gregory XV gave a better organization to the Roman Catholic missions by the foundation of the Propaganda, and they are now very widely spread and carried on with much energy.

The earliest Protestant foreign mission appears to have been one which was established in Brazil in 1555. Gustavus Vasa, King of Sweden from 1523 to 1560, towards the close of his reign sent forth a mission to convert the Laplanders. Shortly after the settlement of New England in 1620 John Eliot took a deep in-

terest in the condition of the North American Indians, and in 1646 began a regular mission among that people. But these were only isolated trivial efforts, and it was not until the eighteenth century that the true missionary spirit awoke. The English took the lead in this movement, but were speedily followed by Danes and Germans, especially the Moravian Brethren. In England in 1701 an association was formed for mission purposes, called the Society for the Propagation of the Gospel in Foreign Parts, in connection with the Church of England. John Wesley labored from 1735 to 1737 as a missionary of this body in Georgia. Its operations are chiefly devoted to the British colonies. The first mission of the Wesleyan Methodists was sent out in 1786 to the West Indies. They have now stations in India, Ceylon, China, Africa, etc. The Baptist Missionary Society, the operations of which have been crowned with remarkable success, was founded in 1792, in consequence of the exhortations of William Carey, who himself went as missionary to India. The two most distinguished missionaries belonging to this society besides Carey were Marshman and Ward. The society afterwards founded stations in China and Japan, Palestine, the West Indies, Equatorial Africa, and in some European states. The London Missionary Society was founded in 1795 by evangelical Christians of different denominations. Tahiti was the island which received the first band of missionaries (March, 1797). China and the East Indies, Madagascar, South and Central Africa, the West Indies, etc., followed. The most celebrated missionary to the Pacific was John Williams, and Moffat and Livingstone did good work in the African field. The Scottish Missionary Society was organized at Edinburgh in 1796. Its first mission station was fixed among the Tartars, near the Black and Caspian Seas; but its operations have not been very extensive. The (English) Church Missionary Society was established by members of the Church of England in 1799, and it is one of the chief missionary societies, having missions in Africa, India, Ceylon, China, Japan, Egypt, Arabia, Persia, Palestine, North America, etc. The Established Church of Scotland and the Free and United Presbyterian churches have been active in missionary efforts. After the missions of Great Britain the next in importance are those of the United States, the first missionary society of which country was founded in 1810 under the title of the American Board of Commissioners for Foreign Missions. The American Baptist Missionary Union was founded in 1814, the Methodist Episcopal Church Missionary Society in 1819, the Protestant Episcopal Missionary Society in 1820, the Presbyterian Board of Foreign Missions in 1833. The American missionaries have naturally done much in the conversion of the Indians of their continent, but their missions are widely spread elsewhere.

Mississippi (m i s - i s - s ip'pi; 'Great W a t e r'), the principal river of North America, and one of the largest rivers in the world. It has its source in Lake Itasca, State of Minnesota, whence it issues about 12 feet wide and 2 feet deep; from thence it trends southward through a number of lakes and over a series of rapids until the Falls of St. Anthony are reached; below this it receives the Iowa, the Illinois and the Missouri as tributaries, but the latter is really the main stream, having a length of 2908 miles before the rivers unite, while that of the Mississippi is only 1330 miles. From St. Louis, a little below their confluence, the Mississippi becomes a broad, rapid, muddy river, liable to overflow its banks; lower down it receives in succession the Ohio, Arkansas and Red rivers, and it finally enters the Gulf of Mexico through a large delta with several 'passes,' some distance below New Orleans. The combined lengths of the Missouri and Mississippi are about 4200 miles; the whole area drained by the Mississippi is 1,246,000 sq. miles; the maximum flood volume reaches 1,400,000 cubic feet per second below the Ohio; and the sediment transported to the gulf annually would make a solid block 1 mile square and 26 feet high. Above its junction with the Ohio at Cairo the river enters upon a large alluvial basin, bounded on both sides by high bluffs, and through this plain the river winds for about 1150 miles. The volume is usually smallest in October and greatest in April, and the low-lying lands are subject to terrible floodings during the spring freshets. At many places attempts have been made to secure the river within its banks and save the country from loss and suffering by building dykes, or *levees* as they are called. The sediment carried down, however, is continually raising the bed of the river, and thus breaks are frequently made in these levees. A recent method of improving the river's course, sanctioned by Congress and superintended by Captain Eads, is to construct light willow screens or dams on the shoals and at the wide places on the river where bars already exist. By this a deposit is formed which in time will act as a bank to hem

in the river, while the increased volume thus obtained will help to scour out a deeper channel. The Missouri-Mississippi is now regarded as a single stream, the longest in the world. At Keokuk, Iowa, on the rapids of the Mississippi, has recently been constructed an enormous water dam. See *Water Power*.

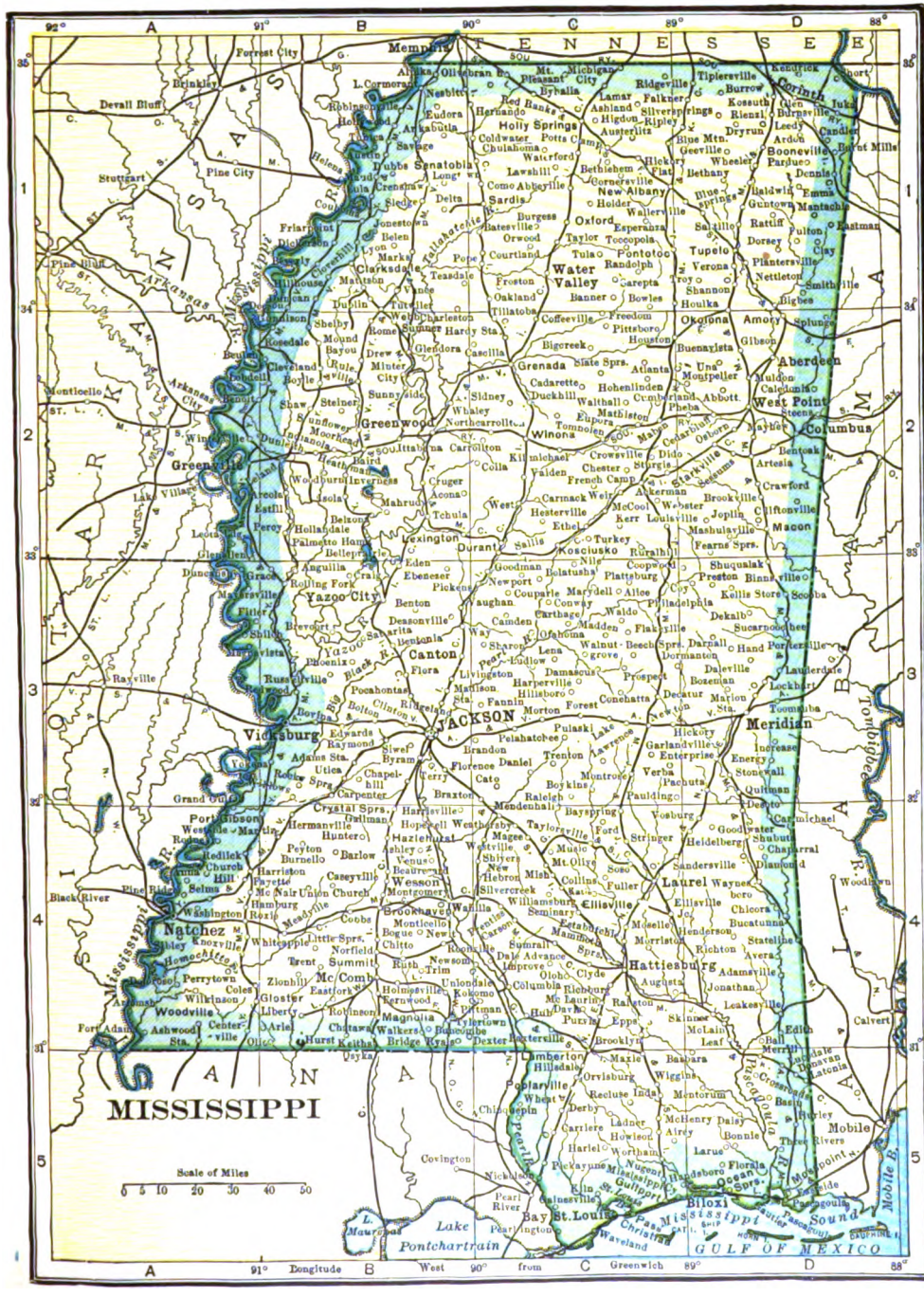
Mississippi, one of the Southern United States; bounded north by Tennessee, east by Alabama, south by the Gulf of Mexico and Louisiana, and west by Louisiana and Arkansas; area, 46,865 sq. miles. The Mississippi winds along its western frontiers for 530 miles. Near the Gulf of Mexico the country is low and swampy, the central part is hilly and mostly prairie-land, a large part of the northeast is covered with forests, while 7000 sq. miles along the Mississippi consist of rich bottom-lands. This river receives the far larger part of the drainage. In the north the climate is tolerably mild and agreeable; but in the south, below lat. 13°, and along the swampy basin of the Mississippi, it is both extremely hot and unhealthy. In the southeast, where the pine forests extend widely, the soil is light and comparatively barren, but large tracts of it are well adapted for pasture. In the northwest, on the borders of the Yazoo, the soil is composed of rich black mould; and in the Mississippi bottom-lands, where it is protected from inundation by embankments or levees, it is of remarkable fertility. The staple of the State is cotton, in which it is surpassed only by Texas and Georgia. Of food plants corn ranks high. The other crops are chiefly oats, sweet potatoes, hay and peas; while fruit is abundant. Grazing is of some importance and there is a considerable wool-clip and large pork product. Minerals are lacking, lignite and fertilizers being the principal. The most extensive manufacturing interest is the cutting and sawing of lumber, while the production of cotton-seed-oil, oil-cake and naval stores is of some importance. The export trade, carried on through New Orleans and Mobile, is chiefly in lumber and cotton, while the river and coasting traffic is large. The railroads extend to about 4500 miles. The State supports a public school system with separate schools for the white and colored races, but the percentage of illiteracy is high. The University of Mississippi (opened in 1848; 650 students) is at Oxford. The capital is Jackson; largest city, Meridian. Other important towns are Vicksburg, Hattiesburg, Laurel, Natchez, Greenville, Biloxi and Columbus. The first permanent settlement of Mississippi was made by some Frenchmen in 1716 at Natchez. It was admitted into the Union 1817. Pop. (1900) 1,551,270; (1910) 1,797,114; (1920) 1,790,618.

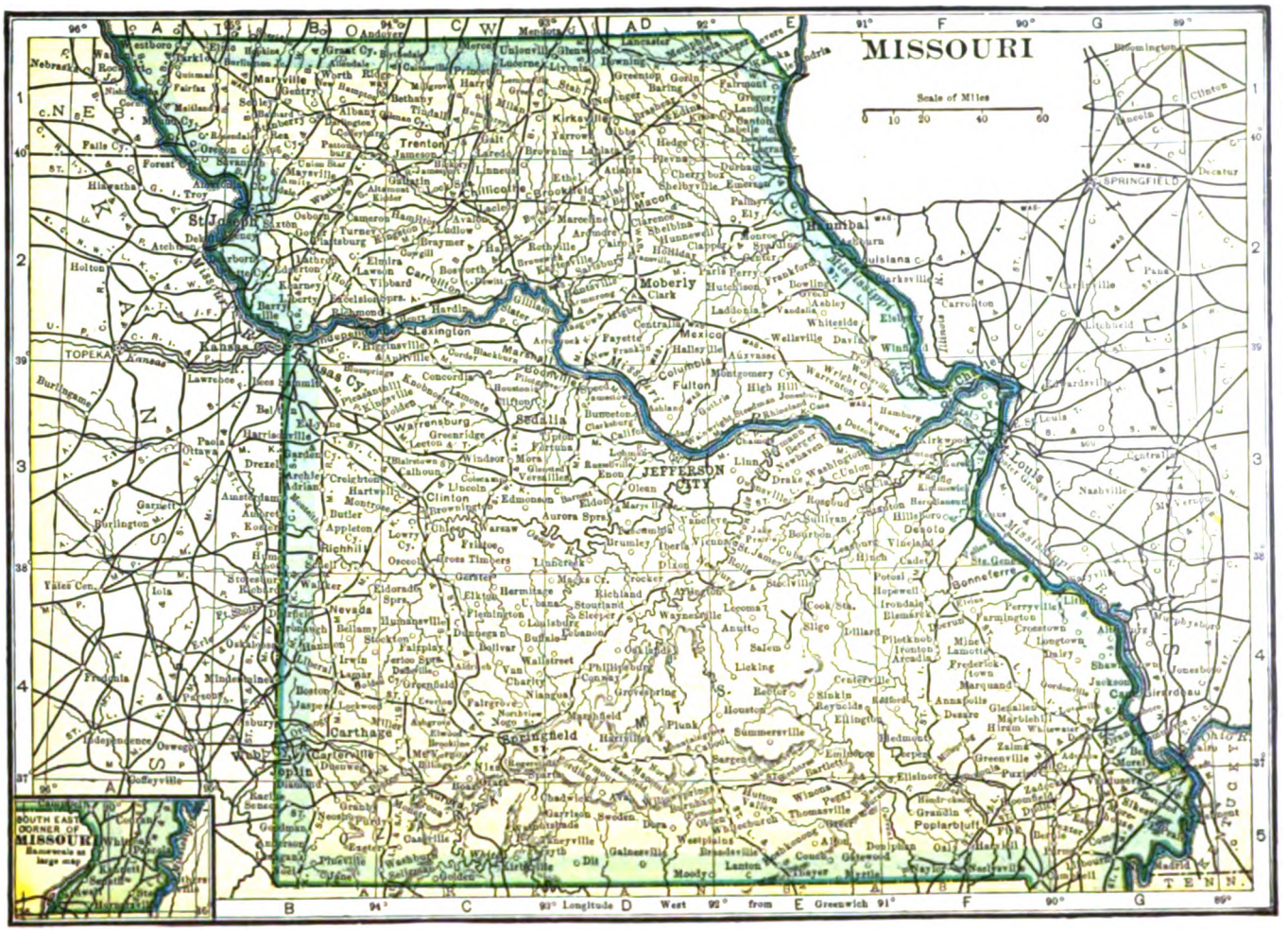
Mississippi Scheme, a bubble scheme projected by John Law at Paris in 1717. Part of the scheme was for the colonization and development of the Mississippi valley, but combined with this there was a banking scheme and a scheme for the management of the national debt, the whole being supported by the French government. Such were the hopes raised by this undertaking that the shares originally issued at 500 livres (say $100) were sold at ten, twenty, thirty and even forty times their value. People came from all parts of France, and even from foreign countries, in order to invest in the company, and there was a general mania of speculation. The government took advantage of the popular frenzy to issue increased quantities of paper money, which was readily accepted by the public creditors and invested in shares of Law's company. This went on till the value of the paper money became depreciated in value and the shares fell in price. All attempts to check the downward course failed, and when Law, the originator of the bankrupt company, fled from France in 1720 the state acknowledged itself debtor to the shareholders to the extent of 1,700,000,000 livres, or $340,000,000. See *Law, John*.

Missolonghi (mis-o-lon'gē), a town in Greece, capital of the monarchy of Acarnania and Ætolia, near the Gulf of Patras, 22 miles west of Lepanto. It is notable for its gallant resistance in 1821 and in 1825-26 to a large Turkish army. Lord Byron died here in 1824, and there is here a cenotaph to his memory. Pop. 8394.

Missoula (miz-zō'la), a city, county seat of Missoula Co., Montana; on two transcontinental lines, in a lumbering, dairying, farming and mining region. It is the distributing center for western Montana and the seat of the University of Montana. Pop. 12,668.

Missouri (miz-zō'rē), a river of North America, which is formed in the Rocky Mountains, in Montana, winds circuitously along the base of the mountains, then east till it reaches the western boundary of North Dakota, and receives the Yellowstone. Here it begins to flow southeastwards through North and South Dakota, then forms the eastern boundary of Nebraska, separating it from Iowa and Missouri; separates for a short distance Kansas from Missouri, then strikes eastwards across the latter State, and joins the Mississippi after a course of 2908 miles. It is navigable 2500 miles from the Mississippi. Its affluents are very


MISSISSIPPI
Scale of Miles
0 5 10 20 30 40 50
Memphis
Vicksburg
JACKSON
Meridian
Natchez
Hattiesburg
Laurel
Greenville
Greenwood
Yazoo City
Canton
Columbus
Tupelo
Corinth
Aberdeen
West Point
Macon
Starkville
Grenada
Oxford
Holly Springs
Water Valley
New Albany
Clarksdale
Cleveland
Indianola
Belzoni
Lexington
Durant
Kosciusko
Winona
Carrollton
Tchula
Yazoo
Rolling Fork
Anguilla
Leland
Arcola
Hollandale
Inverness
Tunica
Lake Cormorant
Hernando
Senatobia
Oxford
Pontotoc
Houston
Okolona
Amory
Fulton
Booneville
Ripley
Ashland
Falkner
Tippah
Tishomingo
Iuka
Burnsville
Kossuth
Rienzi
Dennis
Guntown
Mantachie
Smithville
Nettleton
Shannon
Plantersville
Verona
Randolph
Bowles
Carpenter
Coffeeville
Water Valley
Tillatoba
Sardis
Batesville
Courtland
Pope
Crenshaw
Lula
Coahoma
Jonestown
Friars Point
Dickinson
Belen
Lyon
Marks
Darling
Sledge
Delta
Tallahatchie
Panola
Lafayette
Yalobusha
Calhoun
Chickasaw
Pontotoc
Union
Lee
Itawamba
Monroe
Prentiss
Tippah
Alcorn
Tishomingo
Benton
Marshall
Desoto
Tate
Tunica
Quitman
Coahoma
Bolivar
Sunflower
Leflore
Carroll
Montgomery
Attala
Winston
Noxubee
Kemper
Neshoba
Newton
Lauderdale
Clarke
Jasper
Smith
Scott
Leake
Jones
Wayne
Greene
Perry
Forrest
Lamar
Marion
Pearl River
Hancock
Harrison
Stone
George
Jackson
Gulfport
Biloxi
Pascagoula
Ocean Springs
Bay St. Louis
Pass Christian
Waveland
Lake Pontchartrain
Lake Maurepas
GULF OF MEXICO
Mississippi Sound
Mobile B.
Mobile
Three Rivers
Florida
Alabama
Tennessee
Arkansas
Louisiana
Mississippi R.
Yazoo R.
Big Black R.
Pearl R.
Tombigbee R.
Pascagoula R.
Black River
Pine Ridge
Natchez
Woodville
Fort Adams
Rodney
Port Gibson
Grand Gulf
Rayville
Tallulah
Lake Providence
Transylvania
Monticello
Dumas
Pine Bluff
Stuttgart
Brinkley
Devall Bluff
Forrest City
Helena
Arkansas City
Lake Village
Greenville
Winterville
Metcalfe
Leland
Hollandale
Belzoni
Rolling Fork
Anguilla
Yazoo City
Vicksburg
Port Gibson
Natchez
Woodville
Fort Adams
Rodney


MISSOURI
Scale of Miles
0 10 20 40 60
SOUTH EAST CORNER OF MISSOURI
Enumerated on large map
Longitude West from Greenwich
JEFFERSON CITY
SPRINGFIELD
Kansas City
St. Joseph
Carthage
Joplin
Springfield
Sedalia
Moberly
Hannibal
St. Louis
Columbia
Lexington
Independence
Nevada
Warrensburg
Mexico
Fulton
Bonneterre
Poplar Bluff
Cape Girardeau
Jackson
Carrollton
Chillicothe
Trenton
Maryville
Albany
Bethany
Gallatin
Kirksville
Macon
Brookfield
Marshall
Boonville
Warrenton
Louisiana
Palmyra
Monroe City
Paris
Hannibal
Clarksville
Troy
Wentzville
Wellsville
Washington
Union
Hermann
Rolla
Salem
Licking
Houston
Summersville
Ellington
Piedmont
Ironton
Arcadia
Farmington
Perryville
Sikeston
Caruthersville
Dexter
Kennett
Hayti
Portageville
Malden
Poplar Bluff
Doniphan
Ripley
Van Buren
Eminence
Winona
Thomasville
Alton
West Plains
Willow Springs
Mountain Grove
Hartville
Lebanon
Marshfield
Buffalo
Bolivar
Fair Play
Stockton
Clinton
Butler
Harrisonville
Belton
Raymore
Peculiar
Grandview
Lee's Summit
Blue Springs
Independence
Liberty
Excelsior Springs
Richmond
Carrollton
Hardin
Waverly
Higginsville
Odessa
Concordia
Marshall
Sweet Springs
Boonville
Arrow Rock
Glasgow
Fayette
Huntsville
Moberly
Keytesville
Brunswick
Carrollton
Chillicothe
Trenton
Princeton
Unionville
Memphis
Kirksville
Milan
Green City
Novinger
Edina
Lancaster
Memphis
Shelbina
Shelbyville
Palmyra
Hannibal
Louisiana
Clarksville
Bowling Green
Frankford
Vandalia
Mexico
Centralia
Columbia
Fulton
Jefferson City
Linn
Chamois
Osage City
Washington
Union
Hermann
Gasconade
Owensville
Rolla
St. James
Vienna
Dixon
Waynesville
Lebanon
Conway
Phillipsburg

numerous on both banks, but by far the most important of them are the Yellowstone, the Nebraska or Platte and the Kansas, all from the west.

Missouri (miz-zŏ'rē), one of the United States of America, bounded north by Iowa; east by the Mississippi, which separates it chiefly from Illinois, but partly also from Kentucky and Tennessee; south by Arkansas; and west by Kansas and Nebraska, from which it is partly separated by the Missouri and by Oklahoma; area, 69,420 sq. miles. The surface is traversed by numerous hills and swelling ridges, but the southeast corner is almost an alluvial flat. The most important rivers are the Mississippi and the Missouri, the latter of which crosses the State from west to east, and has several navigable tributaries. Coal, lead, zinc, clays, building stones and iron are the chief minerals; but the output of iron, formerly very large, has ceased to be significant. Mineral waters occur widely. The State as a whole is devoted predominantly to agriculture. Much of the soil is well watered and extremely fertile, and there is a great deal of valuable timber. Missouri ranks high among the corn-growing States. Other products are hay and forage, wheat, oats, cotton, potatoes, tobacco, etc. All kinds of fruits and vegetables are grown in considerable abundance. Stock raising is an important industry. The State contains large deposits of bituminous coal and other minerals accessible for industrial purposes, which fact has resulted in the development of such industries as smelting and refining copper, lead and zinc; marble and stone work; iron and steel blast furnaces; kaolin and ground earths; glass; paint. The location of the cities of the State, in the midst of a great agricultural region, and their proximity and access to raw materials, are factors favorable to the development of manufacturing industries. The numerous navigable streams afford unwonted facilities for traffic, and there are about 8000 miles of railways open in the State. The climate is generally healthy, but subject to extremes. Besides the University of Missouri (founded 1839; 4678 students), at Columbia, there are other colleges and universities, normal schools, schools of agriculture, mining, etc. The capital is Jefferson City; the largest cities are St. Louis and Kansas City. Missouri was at one time part of Louisiana. It was admitted into the Union in 1821. Pop. (1900) 3,106,665 (1910) 3,293,335; (1920) 3,404,055.

Missouri Compromise, an act of the American Congress, passed in 1820, by which Missouri was admitted into the Union as a slave-holding State, but which enacted that slavery should never be established in any future-formed State north of lat. 36° 30'.

Mistassini (mis-tas-sē'nē), a large lake in the northeast territory of Canada, as yet imperfectly known, but reputed to be of large size. With Little Mistassini Lake, which is close beside it, it is an expansion of Rupert River, which flows into James Bay.

Mistletoe (mis'l-tō), the *Viscum album* of botanists, nat. order Loranthaceæ, a European plant growing parasitically on various trees, and celebrated on account of the religious purposes to which it was consecrated by the ancient Celtic nations of Europe, being held in great veneration by the Druids, particularly when it was found growing on the oak. It is a small shrub, with sessile, oblong, entire, somewhat leathery leaves, and small, yellowish-green flowers, the whole forming a pendent bush, covered in winter with small white berries, which contain a glutinous substance. It is common enough on certain species of trees, such as apple and pear trees, hawthorn, maple, lime, and other similar trees, but is very seldom found on the oak. Its roots penetrate into the substance of the tree on which it grows, and eventually it kills the branch supporting it. Traces of the old superstitious regard for the mistletoe still remain, as kissing under the mistletoe at Christmas.

Mitchel, JOHN PURROY (1879-1918), American administrator and soldier, born at Fordham, N. Y.; educated at St. John's College, Fordham, Columbia University and New York Law School. He was admitted to the bar in 1901 and was special counsel to the City of New York from December, 1906, to April, 1907. He became president of the Board of Aldermen in 1909 and was Acting Mayor of New York in August and September, 1910, during the illness of Mayor Gaynor, who was shot by a dissatisfied office-holder. He was appointed Collector of the Port of New York in 1913 and was elected mayor of New York the following year, holding office till 1917. He instituted a number of progressive policies, for some of which he was criticised; for instance, the Gary School plan (q. v.), which he installed in several of the schools. Though his services to New York were recognized, he was defeated for re-election and joined the Aviation Corps of the United States Army. He was promoted to major and looked forward to joining the American squadrons then flying in France, but his

career came to an end July 6, 1918, at Lake Charles, La., where his machine collided with another and he was killed.

Mitchel, ORMSBY M., astronomer, born in Morganfield, Kentucky, in 1809; died in 1862. He was professor of astronomy in Cincinnati College, 1836-1844. In the Civil war he attained the rank of major-general of volunteers.

Mitchell, a city, county seat of Davison Co., South Dakota. It is the seat of the Dakota University; has railroad and machine shops, etc., and a Corn Palace. Pop. (1920) 8478.

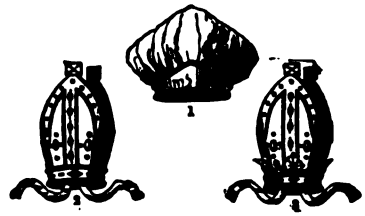
Mitchell, DONALD GRANT, author, born in Norwich, Connecticut, in 1822; died in 1908. *Reveries of a Bachelor*, perhaps his most popular book, appeared in 1850. Others of his works were *Dream Life*, *English Lands, Letters and Things*, etc. He wrote under the pseudonym of IK MARVEL.

Mitchell, JOHN, a famous labor leader, was born in Braidwood, Illinois, February 4, 1870. He worked in the coal mines; joined the Knights of Labor; and in 1895 became secretary-treasurer of the United Mine Workers of America. From 1899 to 1908 he was president of this organization, and as such directed the anthracite miners' strikes, in 1900 and 1902, gaining not only the gratitude of the labor union but the confidence of many leading men. He wrote *Organized Labor, Its Problems, Purposes and Ideals*. Died Sept. 9, 1919.

Mitchell, SILAS WEIR, physician, poet and novelist; born in Philadelphia, Pa., 1829; died, 1914. He studied at the University of Pennsylvania; was graduated at Jefferson Medical College (1850); practiced in Philadelphia and became prominent as a physiologist, especially as a neurologist and toxicologist. His works include *Hugh Wynne, Free Quaker; The Adventures of François; John Sherwood, Iron Master*, and other novels, several volumes of poems, and a number of medical books.

Mite (mīt), a name common to numerous small, in some cases microscopic, animals, of the class Arachnida (spiders) and division Acarida. The cheese-mite is the *Acārus domesticus*, the flour-mite *A. farinæ*, the sugar-mite *A. saccharinus*.

Miter (mī'ter), a sacerdotal ornament worn on the head by bishops and archbishops (including the pope), cardinals, and in some instances by abbots, upon solemn occasions, or by a Jewish high priest. It is a sort of cap pointed and cleft at the top, this form being supposed to symbolize the 'cloven tongues' of the day of Pentecost. The pope has four miters, which are more or less rich



1, Miter of Jewish High Priest. 2, Miter of English Bishop. 3, Miter of English Archbishop.

according to the solemnity of the feast-days on which they are to be worn. The English archbishops have a ducal cornet round their miters.

Mitford (mit'furd), MARY RUSSELL, an English authoress, daughter of a physician at Alresford, Hampshire, and born there in 1786; died in 1855. Her best-known works are *Our Village*, a series of prose sketches descriptive of English country life; her interesting *Recollections of My Literary Life* and *Atherton*, a novel in three volumes, published in 1854.

Mitford, WILLIAM, an English historian, born in 1744; died in 1827. He studied at Queen's College, Oxford, and entered the Middle Temple, but early quitted the profession of law, and obtained a commission in the Hampshire militia, of which he became colonel. His early fondness for Greek led him to undertake a *History of Greece*. The first volume appeared in 1784; the fifth and last, bringing the narrative down to the death of Alexander the Great, was published in 1818. Despite its strong anti-democratic prejudices, until the appearance of the works of Thirlwall and Grote, his history was considered the standard. He held the professorship of ancient history in the Royal Academy, and sat in parliament from 1785 till 1818.

Mithras (mith'ras), the Mitra of the Rig Veda, the sun, or the genius of the sun, with the Persians, which was worshiped as a deity at a later period also in Rome. The cultus of Mithras found its way into all parts of Europe visited by the Roman legions. In Germany many tokens of its former existence are still to be found.

Mithridates or MITHRADATES (mith-ra-dā'tēz), king

of Pontus, on the southern shore of the Black Sea, surnamed the *Great*. His father was murdered B. C. 120, and Mithridates ascended the throne at the age of thirteen. Soon after attaining his majority he commenced his career of conquest, which made him master of nearly all Asia Minor, besides Greece, and brought him into conflict with Rome. In B. C. 88, Sulla led a Roman army into Greece, and restored the Roman power in that country. For four years Mithridates disputed possession of Asia, but was at last compelled to succumb, B. C. 84, and to confine himself to his hereditary dominions, though he soon again began the war. After the death of Sulla, which occurred in B. C. 78, Mithridates levied another army with a determination to expel the Romans from Asia. Being defeated by Lucullus, who was appointed consul B. C. 74, he was followed by the victorious Romans into his own states, and driven to seek refuge in Armenia, then ruled by Tigranes, who refused to deliver him up. Here Mithridates raised a third great army, and in B.C. 67 completely defeated the Romans under Triarius, the lieutenant of Lucullus, who had been recalled; and, following up his success, rapidly recovered the larger part of his dominions. The Romans now invested Pompey with absolute power in the East, and by him, in B. C. 66, the forces of Mithridates were completely routed near the Euphrates. The king retired to Bosporus (the Crimea), where his troops, headed by his son Pharnaces, broke out in mutiny, and Mithridates killed himself, in *n.* C. 63.

Mitla (mit'la), a ruined city of Mexico, 15 miles S. E. of Oajaca, with remains of a prehistoric race.

Mitrailleuse (mit-ra-*yeus'*), a breech-loading machine-gun introduced in France shortly before the Franco-German war of 1870-71. It consisted of a number of rifled barrels, either bound together or bored out of the solid, and mounted on the same principle as an ordinary field piece. Plungers and springs were fixed in connection with the breech ends of the barrels that they might be fired in succession with great rapidity, so as to concentrate a deadly fire upon any desired point. The word is now used by the French to apply to all varieties of machine guns (q. v.).

Mitre, a sacerdotal headdress worn by bishops. See *Miter*.

Mitre (*mitra*), a name of many mollusca inhabiting a small and pretty turreted shell. The shells exhibit a great variety of patterns, and are variegated with every kind of hue. They abound in the seas of hot climates.

Mittau (mit'ou), or Mitau, a town in Courland, Baltic provinces, 29 miles southwest of Riga, formerly under the government of Russia. It was captured by Germany during the European war (q. v.), and temporarily policed by German troops. Capital of the independent state of Courland, provided for in the peace treaty signed by Russia and the Central Powers in 1918. The town is in a low, flat and sandy district of the Aa, and has few industries, though the trade in grain and lumber is extensive. The population in 1913 was 39,200, mainly Germans, but including also 6500 Jews and 5000 Letts and Russians.

Mittimus (mit'i-mus), in law, a warrant of commitment to prison; also a writ for removing records from one court to another.

Mittweida (mit'vī-dä), a town of Saxony, on the Zschoppau, 36 miles southeast of Leipzig. It has extensive manufactures of textile fabrics. Pop. 16,119.

Mitylene (mit'i-lē-nē). See *Lesbos*.

Mivart, St. George, naturalist and scientist, born in 1827; educated at Harrow; King's College, London; and the Roman Catholic College at Oscott. He was called to the bar in 1851, but devoted himself chiefly to science. He was professor of biology at the Roman Catholic College at Kensington, secretary to the Linnæan Society, and vice-president of the Zoölogical Society. Among his works are *The Genesis of Species* (combating the Darwinian 'natural selection'), *Man and Apes*, *Contemporary Evolution*, *The Cat*, *Nature and Thought*, etc. He died in 1900.

Mizzen (miz'n), a term applied to the aftermost mast of a three-masted vessel, that is, the one nearest the stern. In a four-master the jigger-mast comes between it and the stern.

Mkwawa. See *Okwawa*.

Mnemonics (nē-mon'iks), the art of assisting the memory of methods of association. Many devices have been devised for assisting in the recollection of facts, dates, numbers, or the like, but they all go on the principle of associating the thing to be remembered with something else which can be more easily recollected. The art dates from a very early period, Simonides, the Greek poet (500 B. C.), having devised a system. All the systems are more or less arbitrary, and their chief value would seem to lie in the exercise which they give the memory, thereby strengthening it. Students, salesmen, physicians, etc., frequently

use a mnemonic system. Memorial lines and verses have been extensively used as aids to memory.

Mnemosyne (nē-mos'i-nē; Greek, 'Memory'), in the Greek mythology, daughter of Urānus (Heaven) and Gaia (Earth), and by Zeus the mother of the nine Muses.

Moa (mō'a), an extinct bird of New Zealand. See *Dinornis*.

Moab (mō'ab), the land of the Moabites, a tribe dwelling in the mountainous region east of the Dead Sea. According to the Mosaic account (Gen. xix, 30) the Moabites were descended from Moab, the son of Lot by his eldest daughter. In the time of the judges they were for eighteen years masters of the Hebrews, but in the time of David were rendered tributaries to them. After the Babylonish captivity they lost their separate national existence.

Moabite Stone (mō'a-bīt), a monument of black basaltic granite about 3 feet 5 inches high and 1 foot 9 inches wide and thick, with rounded top but square base, on which there is an inscription of thirty-four lines in Hebrew-Phœnician characters, discovered in 1868 at Dhiban in the ancient Moab. It was unfortunately broken by the natives, but almost the whole of the inscription has been recovered from the broken pieces. The inscription dates about 900 B.C., and is the oldest known in the Hebrew-Phœnician form of writing. It was erected by Mesha, king of Moab, and is a record of his wars with Omri, king of Israel, and his successors.

Moallakat. See *Arabian Literature*.

Moat (mōt) or DITCH, in fortification, a deep trench dug round the rampart of a castle or other fortified place, and often filled with water.

Moberly (mō'bėr-li), a city of Randolph Co., Missouri, 146 miles W. of St. Louis. It is a division point of the Wabash system and has railroad, machine and car shops. Its manufactures include shoes, railway boiler accessories, hay presses, paving brick and road culverts. Coal mines are located in the vicinity. Near the city is the great Holtsinger Duroc Jersey hog farm. It is an important shipping point for farm produce, livestock, wool, etc. Pop. (1910) 10,923; (1920) 12,808.

Mobile (mō-bēl'), a city, seaport, and county seat of Mobile Co., Alabama, on Mobile River at its entrance into Mobile Bay, 140 miles E. N. E. of New Orleans, and 26 miles N. of the Gulf of Mexico. It has become the largest shipbuilding and ship repair port south of Newport News. The city occupies about 17 square miles of a sandy plain, which rises gradually from a low water front along the river to a range of hills a few miles to the west. Its buildings include the U. S. government building, Marine Hospital, Battle House, Medical School of the University of Alabama, Spring Hill College, McGill Institute, etc. It has an excellent harbor, with steamship lines to home and foreign ports; and extensive shipments of cotton, lumber, fruit and vegetables and naval stores. During the Civil war the main body of the Confederate fleet was destroyed, August 5, 1864, by Admiral Farragut. In the War of 1812 an American post on Mobile Bay was captured by the British fleet, February 11, 1815, unaware that a peace treaty had been signed. Pop. (1910) 51,521; (1920) 60,151.

Mobile, a river of the United States, in Alabama, formed by the union of the Alabama and the Tombigbee, which unite about 45 miles above the town of Mobile. It enters Mobile Bay by two mouths.

Mobile, GARDE. See *Garde Nationale Mobile*.

Mobile Bay, an estuary of the Gulf of Mexico, from 8 to 18 miles wide, and about 35 miles in length, N. to S., the general depth being 12 to 14 feet.

Mobilier. See *Crédit Mobilier*.

Mobilization (mob-il-i-zā'shun), a military term, being the act of putting troops into a state of readiness for active service. The mobilization of an army or a corps includes not

only the calling in of the reserve and the men on furlough, but the organizing of the staff, as well as the commissariat, medical, artillery, and transport services, the accumulating of provisions, munitions, and the like.

Moccasin (mok'a-sin), a shoe or cover for the feet, made of deer-skin or other soft leather, without a stiff sole, and ornamented on the upper part; the customary shoe worn by the native American Indians.

Moccasin Snake, a very venomous serpent (*Cenchris* or *Ancistrŏdon piscivŏrus*), frequenting swamps in many of the warmer parts of America. It is about two feet in length, dark-brown above, and gray below. It occurs in parts of the Southern United States.

Mocha (mok'a), or MOKHA, an Arabian fortified seaport, on the Red Sea, about 40 miles within the Strait of Bâbel-Mandeb, the chief port and emporium in the dominions of the Imâm of Sanna. It owes its importance to the coffee trade. Pop. 5000.

Mocha-stone, a variety of dendritic agate, containing dark outlines like vegetable filaments, and called also *Moss-agate.*

Mocking-bird, an American bird of the thrush family (*Mimus polyglottus*). It is of an ashy-brown color above, lighter below, and is much sought for on account of its wonderful faculty of imitating the cries or notes of almost every species of animal, as well as many noises that are produced artificially. Its own notes form a beautiful and varied strain. It inhabits North America chiefly, being a constant resident of the Southern States, and but rare and migratory in the northern parts of the continent. It is also found in the West Indian Islands and in Brazil.

Mock-orange. The name given to the sweet Syringa (*Philadelphus coronarius*), a shrub with creamy-white flowers which somewhat resemble orange blossoms. Also the ornamental yellow fruit of the osage orange (*Maclura aurantiaca*), which is called mock-orange in the Southern States.

Mode (mōd), in music, a species of scale of which modern musicians recognize only two, the *major* and the *minor modes.* See *Major, Gregorian Tones.*

Modena (mō'dā-na; anciently, *Mutina*), a town of North Italy, capital of the province of its own name, situated in a somewhat low but fertile plain, between the Secchia and the Panaro. It is built with regularity, and has various open areas. Modena is the ancient *Mutina*, in the territory of the Boii, and became the seat of a Roman colony in 183 B.C. The most remarkable edifices are the cathedral, consecrated in 1184, a fine specimen of the Romanesque style, with interesting sculptures, monuments and campanile; several fine churches; the ducal palace; art academy; the university; the public library, etc. The manufactures and trade are unimportant. Pop. 76,584.—Modena was formerly an independent duchy bordering on Tuscany, Lucca, Bologna, Mantua and Parma; area, 2340 square miles. It is now divided into the provinces of Modena (1003 square miles; pop. 373,506), Massa-e-Carrara, and Reggio.

Modernism (mod'er-nizm), the term applied to a complex movement in the Roman Catholic Church, which began as an attempt to break loose from traditional orthodoxy, and broadened into a thoroughgoing revolt against the authority of the Vatican. Its leaders won a certain amount of celebrity in the fields of Biblical criticism and ecclesiastical history. They denied that the spirit of religion could be imprisoned in any unalterable formula, and insisted that it was in constant need of restatement and reinterpretation. The movement grew from 1888 until 1907, in which latter year Pius X condemned it in his encyclical *Pascendi Dominici Gregis.* A further decree of 1910, making it incumbent upon candidates for holy orders to expressly repudiate modernism, practically put an end to the movement.

Modesto (mō-des'tō), a city, county seat of Stanislau Co., California, on Tuolumne River, 90 miles S. of San Francisco, in a fruit, dairy and farm district. Pop. (1920) 9241.

Modica (mō'dē-kă), a town of Sicily, in the province of and 31 miles W.S.W. of Syracuse. It exports grain, oil, wine, cheese, etc. Pop. 55,924.

Modillion (mo-dil'yun), in architecture, a block carved into the form of an enriched bracket, used under the corona in the cornice of the Corinthian and Composite orders, and occasionally also of the Roman Ionic.

Modjeska (mod'jes-ka), HELENA, a Polish actress, born at Cracow in 1844. She won success at Cracow and played leading parts at Warsaw from 1868 to 1876. She was twice married, emigrating to California with her second husband in 1877. There she returned to the stage, playing in English-speaking parts, and won the reputation of being one of the best emotional actresses. She died in 1909.

Modocs (mō'dokz), an American Indian tribe, originally settled on the S. shore of Klamath Lake, California. From 1847 till 1873 they were in continual conflict with the whites. Only a small remnant of them now exists in the Indian territory and in Oregon.

Modugno (mo-dụn'yō), a town of South Italy, province Bari. It has textile factories. Pop. 11,885.

Modulation (mod-ū-lā'shun), in music, the transition from one key to another. The simplest form is the change from a given key to one nearly related to it, namely, its fifth (dominant), fourth (subdominant), its relative minor, or the relative minor of its fifth. Modulation is generally resorted to in compositions of some length, for the purpose of catching and pleasing the ear with a fresh succession of chords.

Modus Vivendi, a phrase signifying 'mode of living,' is now used to signify a temporary arrangement between two countries, providing for the management of certain affairs pending negotiations for a treaty for the final settlement of these affairs.

Möen (meu'en), an island belonging to Denmark, on the southeast of Seeland; area, about 80 square miles. Its highest point above the sea is 460 feet. It is very fertile and picturesque. Pop. 15,780.

Mœris (mē'ris), an ancient lake basin in Egypt, formerly identified with Lake Birket-el-Kurû in the Fayûm. Lake Mœris, long since dried up, lay further to the S. E., and was probably an artificial excavation for the purpose of receiving the superabundant water during the inundation of the Nile, and distributing its contents over the fields when the overflow was insufficient. It is said to have been 450 miles in circumference and about 300 feet deep.

Moero (mō'e-rō), a lake of Central S. Africa, lying southwest of Tanganyika, and drained by the Luapula. It was discovered by Livingstone.

Mœsia (mē'si-a), in ancient geography, a country lying north of Thrace and Macedonia, and south of the Danube, corresponding to the modern Servia and Bulgaria.

Mœso-Gothic (mē'sō), the language of the Mœso-Goths, or Goths of Mœsia.

Mœso-Goths, a tribe of Goths who settled in Mœsia on the Lower Danube, and there devoted themselves to agriculture, under the protection of the Roman emperors. See *Goths*.

Moffat (mof'at), a watering-place of Scotland, in the county of Dumfries, pleasantly situated in an amphitheater of rounded hills in the valley of the Annan. It has mineral springs, a hydropathic establishment, assembly rooms, etc., and is much frequented by visitors in summer. Pop. about 2500.

Moffat, ROBERT, Scottish missionary traveler, born in 1795; died in 1883. He began missionary work in South Africa in 1813, and in 1818 made a long exploratory tour in the Damara Country. During the visit to Britain in 1842 he published an account of his travels, and a translation of the New Testament and Psalms in the Bechuana language. One of his daughters became the wife of Dr. Livingstone.

Mogador (mog-a-dōr'), a seaport of Morocco, about 110 miles west by south of the city of Morocco. It is fortified, and has a good harbor. The mosques are some of them splendid specimens of architecture. The exports are wool, gum, wax, hides, skins, honey, ostrich feathers, etc. Pop. about 20,000.

Mogul (mō-gul'), a word which is the same as *Mongol*, but is applied particularly to the sovereigns of Mongolian origin, called Great or Grand Moguls, descendants of Tamerlane, who ruled in India from the sixteenth century downwards, the first of them being the conqueror Baber. See *India*.

Mohács (mo'hăch), a town of Hungary, on the Danube, 25 miles E. S. E. of Fünfkirchen. It carries on an active trade, being a station for steamers plying on the Danube. Here Solyman the Magnificent defeated the Hungarians in 1526, and the Turks were defeated by the Duke of Lorraine in 1687. Pop. 15,812.

Mohair (mō'hār), the hair of the Angora goat of Asia Minor. It is soft and fine as silk, of a silvery whiteness, and is manufactured into dress-goods. The term is also applied to a woolen and cotton fabric resembling the true mohair.

Mohammed (mō-ham'ed), MAHOM'ET, or more correctly MUHAMMED, the founder of Islamism, was an Arabian by birth, of the tribe of the Koreish, and was born of poor parents in 571 A.D., in Mecca. His parents died early and he was brought up by his uncle Abu Talib, who trained him to commerce, and with whom he journeyed through Arabia and Syria. In his twenty-fifth year his uncle recommended him as agent to a rich widow, named Chadidja, and he acquitted himself so much to her satisfaction that she married him, and thus placed him in easy circumstances. She was fifteen years older than he, but he lived with her in happy and faithful wedlock. He

seems to have had from his youth a propensity to religious contemplation, for he was every year accustomed, in the month Ramadhan, to retire to a cave in Mount Hara, near Mecca, and dwell here in solitude. Mohammed began his mission in the fortieth year of his age by announcing himself to his own family as the apostle of a new religious mission. His wife was one of the first to believe in him, and among other members of his family who acknowledged his mission was his cousin Ali, the son of Abu Talib. Of great importance was the accession of Abu Bekr, a man of estimable character, who stood in high respect, and persuaded ten of the most considerable citizens of Mecca to join the believers in the new apostle. They were all instructed by Mohammed in the doctrines of *Islam*, as the new religion was styled, which were promulgated as the gradual revelations of the divine will, through the angel Gabriel, and were collected in the Koran (which see). After three years Mohammed made a more public announcement of his doctrine, but for years his followers were few. In 621 Mohammed lost his wife, and the death of Abu Talib took place about the same time. Deprived of their assistance, he was compelled to retire, for a time, to the city of Taif. On the other hand, he was readily received by the pilgrims who visited the Kaaba (which see), and gained numerous adherents among the families in the neighborhood. Mohammed now adopted the resolution of encountering his enemies with force. Only the more exasperated at this they formed a conspiracy to murder him. Warned of the imminent danger, he left Mecca, accompanied by Abu Bekr alone, and concealed himself in a cave not far distant. Here he spent three days undiscovered, after which he arrived safely at Medina, but not without danger (A.D. 622). This event, from which the Mohammedans commence their era, is known under the name of the Hejra, which signifies *flight*. In Medina Mohammed met with the most favorable reception; thither he was followed by many of his adherents. He now assumed the sacerdotal and regal dignity, married Ayesha, daughter of Abu Bekr, and as the number of the faithful continued to increase, declared his resolution to propagate his doctrines with the sword. In the battle of Bedr (623), the first of the long series of battle by which Islamism was established over a large portion of the earth, he defeated Abu Sofian, the chief of the Koreishites. He in turn was defeated by them at Ohod, near Medina, soon after, and in 625 they unsuccessfully besieged Medina, and a truce of ten years was agreed on. Wars with the Jewish tribes followed, many Arabian tribes submitted themselves, and in 630 he took possession of Mecca as prince and prophet. The idols of the Kaaba were demolished, but the sacred touch of the prophet made the black stone again the object of the deepest veneration, and the magnet that attracts hosts of pilgrims to the holy city of Mecca. The whole of Arabia was soon after conquered, and a summons to embrace the new revelation of the divine law was sent to the Emperor Heraclius at Constantinople, the King of Persia, and the King of Abyssinia. Preparations for the conquest of Syria and for war with the Roman Empire were begun, when Mohammed died at Medina (632). His body was buried in the house of Ayesha, where he died, and which afterwards became part of the adjoining mosque, and a place of pilgrimage for the faithful in all time to come. Of all his wives, the first alone bore him children, of whom only his daughter Fatima, wife of Ali, survived him. There is no doubt that Mohammed was a man of extraordinary insight and deep reflection. Though without book-learning, he had a deep knowledge of man, was familiar with Bible narratives and eastern legends, and possessed a grasp of the eternal ground of all religion, though tinged and modified by his vivid poetic imagination. See *Koran*, *Mohammedanism*.

Mohammed, the name of five Ottoman sultans, of whom the careers of Mohammed I and II are treated under *Ottoman Empire* (which see). Mohammed (or Mahomet) III (1568-1603), and IV (1649-91) were feeble rulers. Mohammed (or Mehmed) V succeeded April 27, 1909, on the deposition of his brother Abdul-Hamid in consequence of a revolution. He was born in 1844, and had spent many years in seclusion before he was taken from his virtual prison to ascend the throne of Turkey.

Mohammed Ahmed. See *Mahdi*.

Mohammed Ali. See *Mehemet Ali*.

Mohammedanism (mō-ham'e-dan-izm), the name commonly given in Christian countries to the creed established by Mohammed. His followers call their creed *Islam* (entire submission to the decrees of God), and their common formula of faith is, 'There is no God but Allah, and Mohammed is his prophet.' The dogmatic or theoretical part of Mohammedanism embraces the following points:—1. Belief in God, who is without beginning or end, the sole Creator and Lord of the universe, having absolute power, knowledge, glory and perfection.

2. Belief in his angels, who are impeccable beings, created of light. 3. Belief in good and evil Jinn (genii), who are created of smokeless fire, and are subject to death. 4. Belief in the Holy Scriptures, which are his uncreated word revealed to the prophets. Of these there now exist, but in a greatly corrupted form, the Pentateuch, the Psalms, and the Gospels; and in an uncorrupted and incorruptible state the Koran, which abrogates and surpasses all preceding revelations. (See *Koran.*) 5. Belief in God's prophets and apostles, the most distinguished of whom are Adam, Noah, Abraham, Moses, Jesus and Mohammed. Mohammed is the greatest of them all, the last of the prophets and the most excellent of the creatures of God. 6. Belief in a general resurrection and final judgment, and in future rewards and punishments, chiefly of a physical nature. 7. Belief, even to the extent of fatalism, in God's absolute foreknowledge and predestination of all events both good and evil.

The practical part of Mohammedanism inculcates certain observances or duties, of which four are most important. The first is prayer, including preparatory purifications. Prayer must be engaged in at five stated periods each day. On each of these occasions the Moslem has to offer up certain prayers held to be ordained by God, and others ordained by his prophet. During prayer it is necessary that the face of the worshiper be turned towards the kebla, that is, in the direction of Mecca. Prayers may be said in any clean place, but on Friday they must be said in the mosque. Second in importance to prayer stands the duty of giving alms. Next comes the duty of fasting. The Moslem must abstain from eating and drinking, and from every indulgence of the senses, every day during the month of Ramadhan, from the first appearance of daybreak until sunset, unless physically incapacitated. The fourth paramount religious duty of the Moslem is the performance at least once in his life, if possible, of the pilgrimage (el-Hadj) to Mecca, after which he becomes a Hadji. Circumcision is general among Mohammedans, but is not absolutely obligatory. The distinctions of clean and unclean meats are nearly the came as in the Mosaic code. Wine and all intoxicating liquors are strictly forbidden. Music, games of chance, and usury are condemned. Images and pictures of living creatures are contrary to law. Charity, probity in all transactions, veracity (except in a few cases), and modesty, are indispensable virtues. After Mohammed's death Abu Bekr, his father-in-law, became his successor, but disputes immediately arose, a party holding that Ali, the son-in-law of Mohammed, was by right entitled to be his immediate successor. This led to the division of the Mohammedans into the two sects known as Shiites and Sunnites. The former, the believers in the right of Ali to be considered the first successor, constitute at present the majority of the Mussulmans of Persia and India; the latter, considered as the orthodox Mohammedans, are dominant in the Ottoman Empire, Arabia, Turkestan and Africa. The propagation of Mohammedanism by conquest took place with extraordinary rapidity and in a very brief period it spread widely through Southern Asia and Northern Africa and made its way into Spain. The total Mohammedan population of the world is estimated at over 220,000,000. See *Caliph*, *Shiites*, *Sunnites*, etc.

Mohammera (mō-ham'ėr-a), a town of Western Persia, province Khuzistan, at the junction of the Karun with Shat-el-Arab. Pop. 15,000.

Mohave (mo-hä'vā), the name of an Indian tribe of Yuman stock, living along the lower Colorado River, in Arizona and California. They are agricultural, and make pottery and baskets. Mohave Desert is a basin, with little water or vegetation, chiefly in the S. E. of California, and extending into Arizona. The *Mohave River* rises in San Bernardino range, and finally disappears in the Mohave Sink.

Mohawk (mō'hąk), a river of the United States, the principal tributary of the Hudson in the state of New York; affords abundant water-power, and flows through beautiful scenery.

Mohawks, a tribe of North American Indians, belonging to the confederacy of the Five (afterwards Six) Nations. (See *Iroquois.*) They originally inhabited the valley of the Mohawk River. With the rest of the confederacy they adhered to the British interests during the Revolution, and many left the country on its termination for Canada.

Mohicans (mō-hi'kanz), or Mohegans, a tribe of Indians of the great Algonquin family, formerly occupying the country now forming the southwestern parts of New England and New York State east of the Hudson.

Mohilev (mō'hi-lef), a town in Russia, capital of a government of the same name, on both banks of the Dnieper, 212 miles W. S. W. of Moscow. It has spacious streets and a large octagonal square occupied by the principal buildings, among others the palace of the Greek archbishop and the bazaar. The staple manufacture is tobacco; and the

trade with Riga, Memel, Dantzig and Odessa, chiefly in leather, wax, honey, potash, oil and grain, is very extensive. Pop. 43,106.—The government has an area of about 18,545 square miles. Pop. 4,708,041.—There is another Mohilev in the government of Podolia, on the left bank of the Dniester, 60 miles E. S. E. of Kamenetz, with a pop. of 22,100.

Mohilla. See *Comoro Islands.*

Mohur (mō'hur), an Indian gold coin, value fifteen rupees.

Moidore (moi'dōr; from the Portuguese, *moeda d'ouro*, literally, coin of gold), a gold coin formerly used in Portugal (from 1690-1722), of the value of 4800 reis, or about $6.75.

Moir, DAVID MACBETH, better known by his pseudonym of *Delta*, poet and miscellaneous writer, born at Musselburgh, Scotland, in 1798. He adopted the medical profession, as a practitioner of which in his native town the whole of his life was spent. He early showed a turn for literary composition, both in prose and verse, and became a frequent contributor, first to *Constable's* and afterwards to *Blackwood's Magazine*, where his more serious effusions were subscribed by a Δ. In the latter magazine most of his writings in prose and verse, including the inimitable *Autobiography of Mansie Waugh, Tailor in Dalkeith*, first appeared. He died in 1851.

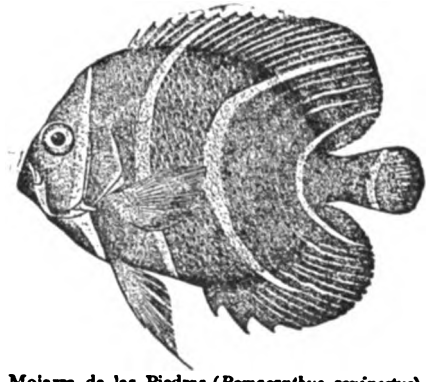
Moiré (mwȧ-rā), the French name given to silks figured by the process called watering. The silks for this purpose, though made in the same way as ordinary silks, are of double width, and must be of a stout, substantial make. They are folded and subjected to an enormous pressure, of from 60 to 100 tons, generally in a hydraulic machine, and the air in trying to escape drives before it the small quantity of moisture that is used, and hence is effected the permanent marking called watering, which is for the most part in curious waved lines. The finest kinds of watered silks are known as *moirés antiques*. Woolen fabrics to which the same process has been applied are called *moreen*.

Moirée Métallique, tin-plate showing a crystallized surface through the action of acids; also, iron-plate coated with tin, and having the coating more or less removed by acids, so as to give it a variety of shades.

Moissac (mwȧs-ȧk), a town of France, dep Tarn-et-Garonne, on the Tarn. Pop. 4523.

Mojanga (mō'jun-ga), a seaport on the northwest coast of Madagascar.

Mojarra de Las Piedras (mō-har'ä), a fish found on the west coast of Mexico and Central America from Mazatlan to Panama.



Mojarra de las Piedras (*Pomacanthus zonipectus*). From Bulletin 47, U. S. Nat. Museum.

Mokanna (mo-kan'na), AL, HAKEM IBN HASHEM, styled the *Veiled Prophet*, a Mohammedan impostor of Persia in the eighth century. He attributed to himself divine powers, and gained many followers, so that at last the caliph was compelled to send an armed force against him. He retired to a fortress in Trasoxiana, where he first poisoned and burned his family, and then burned himself. His followers continued to pay him divine honors after his death. He is the hero of Moore's Veiled Prophet of Khorassan.

Mola-di-Bari (mō'la-dē-bä'rē), a seaport of S. Italy, in the province and 12 miles E. S. E. from Bari, on the Adriatic. The district produces wine and olives. Pop. 13,962.

Molar Teeth. See *Teeth.*

Molasse (mu-las'), a soft greenish sandstone which occupies the country between the Alps and the Jura.

Molasses (mu-las'ez), the uncrystallized syrup produced in the manufacture of sugar. It differs from treacle, as molasses comes from sugar in the process of making, treacle in the process of refining.

Mold (mōld), a borough of North Wales, in Flintshire, 6 miles south of Flint and 12 miles west of Chester. The principal industries are collieries, lead mines, mineral oil works, limestone quarries and potteries in the neighborhood. Pop. 4875.

Moldau (mol'dou), the chief river of Bohemia, which, after passing through Prague, joins the Elbe; length, 260 miles.

Moldavia. See *Roumania.*

Mole (mōl), a name given to insectivorous animals of the genus *Talpa*, family Talpidæ, which, in search of worms or insect larvæ, form burrows just under the surface of the ground, throwing up the excavated soil into a little ridge or into little hills. The common mole (*T. europea*) is found all over Europe, except in the extreme south and north. It is from 5 to 6 inches long; its head is large, without any external ears; and its eyes are very minute, and concealed by its fur, which is short and soft. Its forelegs are very short and strong, and its snout slender, strong and tendinous. Another species (*T. cæca*, or blind mole) is found in the south of Europe. It has its name from its eye being always covered by its eyelid. The Cape mole, or changeable mole (*Chrysochlōris capensis*), is remarkable as being the only mammal that exhibits the splendid metallic reflection which is thrown from the feathers of many birds. The 'star-nosed moles' of North America (*Condylūra macrūra*) are so-named from the star or fringe-like arrangement of the nasal cartilages. The shrew moles (*Scalops*) of North America are more properly included among the shrews.

Mole, a mound or massive work formed of large stones laid in the sea so as to partially inclose and shelter a harbor or anchorage.

Mole-cricket, a name given to certain insects from the peculiar similarity of the anterior extremities of the species, and from the resemblance in their habits, to those of the mole. The best-known species (*Gryllotalpa borealis*), common in the United States, is about 1½ inches long and of a brown color. In making its burrows it cuts through the roots of plants and commits great devastation in gardens. A larger species is found in South America.

Molecule (mol'e-kūl), the smallest quantity of any elementary substance or compound which is capable of existing in a separate form. It differs from *atom*, which is known to us only as a conception, inasmuch as it is always a portion of some molecular aggregate of atoms. *Molecular attraction* is that species of attraction which operates upon the molecules or particles of a body. Cohesion and chemical affinity are instances of molecular attraction. See *Chemistry.*

Mole-marsupial (mō'l' mär-sū-pi-al), a small marsupial inhabiting the desert region of South Australia. It has the habits and appearance of a small mole. Its color is

Mole-marsupial (*Notorycles typhlops*).

pale yellow and the nose has a horny shield; the tail is bare and leathery. The species is very rare. See *Marsupialia.*

Mole-rat, a name given to rodents of the genus *Spalax*, family Spalacidæ. They are dumpish stout-bodied rodents, with short, strong limbs, a short or scarcely any tail, and minute or rudimentary eyes and ears. They make tunnels and throw up hillocks like the mole, but their food appears to consist wholly of vegetable substances. All the species belong to the Old World, *S. typhlus* inhabiting the south of Russia and some parts of Asia.

Moleskin (mōl'skin), a strong twilled cotton fabric (fustian), cropped or shorn before dyeing; much used for workmen's clothing. So called from its being soft, like the skin of a mole.

Molfetta (mōl-fet'ta), an Italian port on the Adriatic, on the railway from Ancona to Brindisi, 15 miles W. N. W. of the city of Bari. It has a cathedral and several other churches and a college; manufactures of linen and saltpeter; a harbor, well sheltered except on the north; and a considerable trade. Pop. 42,363.

Molière (mō-lyār), the assumed name of Jean Baptiste Poquelin, a French comic dramatist, born at Paris in 1622. His father was a tradesman connected with the court, and he received a good education. He studied law, but gave it up for the career of an actor, assuming in this profession the name of Molière. After obtaining great success in the provinces he settled in Paris in 1658, having previously produced his two comedies, *L'Etourdi* and *Le Dépit Amoureux.* In the following year his reputation was greatly advanced by the production of the

Précieuses Ridicules, a delicate satire on the prevailing affectation of the character of *bel esprit*, on the pedantry of learned females, and on affectation in language, thoughts and dress. It produced a general reform when it was brought forward in Paris. Continuing to produce new plays, and performing the chief comic parts himself, he became a great favorite both with the court and the people, though his enemies, rival actors and authors, were numerous. Louis XIV was so well pleased with the performances of Molière's company that he made it especially the royal company, and gave its director a pension. In 1662 Molière made an ill-assorted marriage with Armande Béjart, upwards of twenty years younger than himself, a union that embittered the latter part of his life. Among his works other than those mentioned may be noted: *L'Ecole des Maris*, *L'Ecole des Femmes*, *Le Mariage Forcé*, *Don Juan*, *Le Misanthrope*, *Le Médecin Malgré lui*, *Le Tartufe*, *L'Avare*, *George Dandin*, *Les Fourberies de Scapin*, *Le Malade Imaginaire*, etc. Molière died in 1673 of an apoplectic stroke, a few hours after playing in the latter. As a player he was unsurpassed in high comic parts; and in the literature of comedy he bears the greatest name among the moderns after Shakespere. He borrowed freely from Latin, Spanish and Italian writers, but whatever materials he appropriated he so treated them as to make the result entirely his own and original. The Archbishop of Paris at first refused him burial as being an actor and a reviler of the clergy; but the king himself insisted on it.

Molina (mō-lē'na), Luis, a Jesuit and professor of theology at the Portuguese university of Evora, was born at Cuenca, in New Castle, in 1535, and died in 1601 at Madrid. He has become known by his theory of grace. In order to reconcile man's free-will with the Augustinian doctrine of grace, he published a work in which he undertook to reconcile the free-will of man with the foreknowledge of God and predestination. It caused lengthened discussion, and passed subsequently into the Jansenist controversy. Molina was attacked by Pascal in the Provincal Letters.

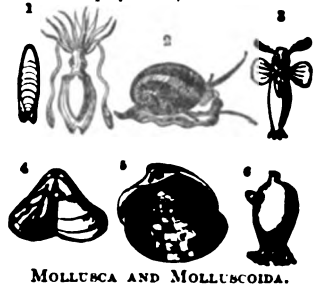
Moline (mo-lēn'), a city of Rock Island County, Illinois, on the east bank of the Mississippi River, about 4 miles above Davenport, Iowa, on the Chicago, Rock Island and Pacific and other railroads, and is an important manufacturing center, having abundant water-power. Here are large plow and corn-planter factories; also steel and iron works, railroad shops, an elevator factory, motor truck and many other factories. Pop. (1910) 24,199; (1920) 30,709.

Molinos (mo-lē'nos), Miguel, a Spanish mystic and theologian, born in 1627; died in 1696. In 1675 he published the *Spiritual Guide*, an ascetical treatise, which promulgated the new religious doctrine known as *Quietism*. In 1685 he was cited before the Holy Office, and in 1687 the Inquisition condemned his works. He spent the rest of his days as a prisoner in a convent of the Dominicans.

Mollah (mol'ə), an honorary title accorded to any one in Turkey who has acquired respect from purity of life, or who exercises functions relating to religion or the sacred or canon law. The title is not conferred by any special authority, but springs spontaneously from public respect. It is nearly equivalent to *master*, *excellency*, in English.

Mollendo (mol-en'dō), a small seaport on the coast of Peru, dep. Arequipa, with a considerable trade. Pop. about 2200.

Mollusca (mol-us'ka), an animal subkingdom, comprising those soft-bodied animals known as slugs, snails, limpets, oysters, cockles, etc. In some the body is naked and unprotected, in others it is enclosed in a muscular sac, but the great majority are provided with an exoskeleton or *shell*. The shell-bearing molluscs are popularly divided into *univalves*, *bivalves* and *multivalves*. The univalves are those whose shell consists of only a single piece, often open and cup-shaped, as in the limpet, or more commonly of a long cone wound spirally round a real or imaginary axis, as the garden-snail, the whelk or periwinkle. The bivalves are those of which the shell is formed of two pieces joined by a hinge, as the cockle and oyster. The multivalves



Mollusca and Molluscoida.

1, *Sepia officinalis* (cuttle-fish) and cuttle-bone—class Cephalopoda. 2, *Nerita albicella*—a gasteropod. 3, A pteropod. 4, *Terebratula diphya*—class Brachiopoda. 5, *Cyrithea maculata*—class Lamellibranchiata. 6, *Cynthia papillosa*—class Tunicata.

have the shell composed of several pieces. These latter molluscs are few in number. The shells of the Mollusca are secreted by the soft integument or *mantle* (also called the *pallium*). The chief mass of the shell is made up of carbonate of lime with a small proportion of animal matter. The mollusca have a distinct alimentary canal, shut off from the general cavity of the body, and situated between the blood system, which lies along the back, and the nerve system, which is towards the ventral aspect of the body to the digestive system consists of a mouth, gullet, stomach, intestine and anus, except in a few forms, in which the intestine ends blindly. The blood is almost colorless. Respiration is variously effected; in the lamp-shells, by long ciliated arms springing from the sides of the mouth; in the bivalve shell-fish, the cuttle-fishes, and most of the univalves, by gills; while in the remainder of the univalves, as snails, slugs, etc., the breathing organs have the form of an air-chamber or pulmonary sac, adapted for breathing air directly. A characteristic of the typical Mollusca is the 'foot' or organ of locomotion, which may be modified so as to perform various offices. Its use in the case of the snail is well known, and in the cockle it is developed to a great size. In some cases (as the razor-shells) it enables the animal to burrow rapidly in the sand; while in the mussels, etc., the organ is devoted to the secretion of the well-known beard or *byssus*, a collection of strong fibrous threads by means of which these animals moor or fix themselves to rocks, etc. In some bivalves (as the oyster) in which the locomotive powers are in abeyance, the foot is rudimentary. In the cuttle-fishes it is represented by the arms or tentacles round the mouth. The chief peculiarity, however, of the Mollusca is in the nervous system, which in the lower forms consists essentially of a single ganglionic mass, giving off filaments in various directions; while in the higher there are three such masses, united to one another by nervous cords. According as they possess one or three ganglia the Mollusca are divided into two great divisions—*Molluscoida*, those having a single ganglion or principal pair of ganglia, and the *Mollusca* proper, possessing three principal pairs of ganglia. The Molluscoida are subdivided into three classes — Polyzōa, comprising the sea-mosses and sea-mats; *Tunicāta*, the sea-squirts; and *Brachiopōda*, of which Lingula and Terebratula (the lamp-shells) are examples. The Mollusca proper are divided into four classes—*Lamellibranchiata*, in which there is no distinct head, comprising mussels, scallops, oyster-

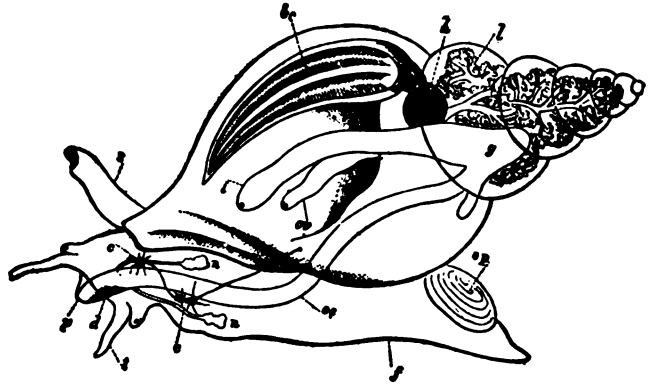
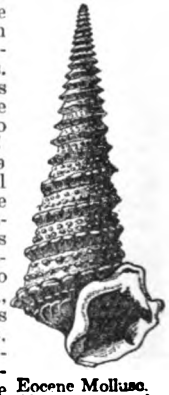


Diagram of the Structure of a Typical Mollusc (the Common Whelk).

f, The muscular foot; *op*, The operculum; *t*, One of the tentacles, or feelers, with an eye at its base; *p*, The proboscis, retracted, with the mouth at its extremity; *oe*, Gullet; *g*, Stomach; *i*, Intestine, terminating in the anus; *n n*, Salivary glands; *l*, The liver and the ovary; *h*, The heart; *bc*, The gill contained in a hood of the mantle; *s*, Breathing-tube or siphon; *c* and *c*, The main nerve ganglia, the one above the gullet being the cerebral ganglia, and the one below the gullet being the combined pedal and parieto-splanchnic ganglia.



Eocene Mollusc. (*Crithium tricarinaum*).

etc.; *Gasteropóda*, comprising the land-snails, sea-snails, whelks, limpets, slugs, sea-lemons, etc.; *Pteropóda*, all minute oceanic molluscs with wing-like swimming organs; and *Cephalopóda*, the highest class, comprising the cuttle-fishes, calamaries and squids, in which the shell is small and concealed internally. Some species of Cephalopods become of enormous size as compared with the shelled molluscs. See these headings, also the *Nautilus argonaut*, and other molluscum titles. The Molluscoida are now usually relegated to a distinct sub-kingdom. See different classes and species.

Molluscoida (mol-us-koi'da), or MOLLUSCOIDEA, a group of animals comprising the Polyzoa, Tunicata and Brachiopoda. The nervous system consists of a single ganglion or a principal pair of ganglia, and the heart is wanting or imperfect. This group is regarded by some as a class in the sub-kingdom Mollusca, by others as itself a sub-kingdom. See *Mollusca*.

Molly Maguires, the name assumed by members of a secret illegal association in Ireland, afterwards reorganized in the anthracite coal-mining district of Pennsylvania. The organization was guilty in the latter region of many outrages, and was broken up in 1876, twenty members being hanged for murder.

Moloch (mō'lok), the chief god of the Phœnicians, frequently mentioned in Scripture as the god of the Ammonites, whose worship consisted chiefly of human sacrifices, ordeals by fire, mutilation, etc.

Moloch Lizard, a genus of lizards found in Australia. *M. horridus* (moloch-lizard) is one of the most ferocious-looking, though at the same time one of the most harmless, of reptiles, the horns on the head and the numerous spines on the body giving it a most formidable and exceedingly repulsive appearance.

Molokai (mō-lo-kī'), an island of the Hawaiian group, about 40 miles long by from 7 to 9 broad. It is noted for its settlement of lepers, all persons on the islands found to be affected with the disease being sent by government to Molokai, and kept entirely isolated from the healthy part of the community. Pop. 2581.

Moltke, (molt'ke), ADAM WILHELM (1785-1864), a Danish statesman, born at Einsiedelsborg in Fünen. He became minister of finance in 1831, and on the death of Christian VIII he took a leading part in framing a liberal constitution, bridging the crisis that had come in political affairs. As premier he formed a cabinet that included all parties and forced upon them acceptance of his progressive policies. The constitution was adopted in 1849. He also presided over the third constitutional ministry formed in 1851. He resigned office the following year, but continued to make his great influence felt during the crucial years when the absolute monarchy system gave place to that of a constitutional monarchy. In 1855 he was elected a member of the Rigsraad, holding office till the year before his death. His grandfather, *Adam Gottlob Moltke* (1710-1792) was the favorite of Frederick V and wielded great influence.

Moltke HELMUTH CARL BERNHARD, COUNT VON, a German field-marshal, born at Mecklenburg in 1800; entered the Danish army in 1819; left that service for the Prussian in 1822, and became a staff-officer in 1832. In 1835 he superintended the Turkish military reforms, and he was present during the Syrian campaign against Mehemet Ali in 1839. He returned to Prussia and became colonel of the staff in 1851, and equerry to the crown prince in 1855. In 1858 as provisional director of the general staff he acted in unison with Von Roon and Bismarck in the vast plans of military reorganization soon after carried out. The conduct of the Danish war (1864) was attributable to his strategy, as was also the success of the Austro-Prussian war of 1866, and the Franco-Prussian war of 1870-71. In the latter year he was made field-marshal, and became count in 1872. He retired from the position of chief of the general staff in 1888. He died in 1891. His nephew, Halmuts von Moltke, born in 1848, succeeded to the position of Chief of Staff in 1906; died in 1916.

Moluccas (mō-luk'az), or SPICE ISLANDS, a name originally confined to the five small islands of Ternate, Tidore, Motir, Makian and Batshian, but now applied to the widely scattered group lying between Celebes and Papua, between lat. 3° S. and 6° N., and lon. 126° to 135° E. They are divided into the residences of Amboyna, Banda, Ternate and Menado: the southern portion being governed directly by the Dutch, and the northern indirectly through native sultans. The area is about 21,500 square miles, and the population 430,000. The islands (some hundreds in number) are nearly all mountainous, mostly volcanic, and earthquakes are by no means uncommon. They abound in gaily-colored birds and gorgeous insects; and are covered by a luxuriant tropical flora. Cloves, nutmegs, mace, and sago are exported to Europe; and birds'-nests, trepang, etc., to

China. The Moluccas have been for centuries alternately in the possession of the Spaniards, Portuguese and Dutch. They were twice taken by the British and given up to Holland, in whose possession they still remain. The natives belong to Malay and Polynesian races, and the general language on the coast is the Malay.

Molybdenum (mu-lib'de-num), one of the rare metals, of a white silvery color, harder than topaz, and having a specific gravity of 8.6; atomic weight, 96. It is unaltered in the air at ordinary temperatures, but is oxidized when heated. The alloys of this metal are generally less fusible, more brittle, and whiter than the metal with which the molybdenum is alloyed.

Mombasa (mom-bä'sa), or MOMBAS, a town on the east coast of Africa, in lat. 4° 6′, S., on an island 3 miles long by ½ mile broad, with one of the best harbors on the coast. The island and town now form part of the territory over which the British East African Company received governing rights from the Sultan of Zanzibar in 1888. The town is dirty and unhealthy, but exports millet, Indian corn, ivory, copal, sesamum (oil-seed), etc. Pop. about 30,000. On the mainland opposite is Freretown, a settlement of the Church Missionary Society.

Moment of Inertia, the sum of the products of each particle of a rotating body, by the square of its distance from the axis of rotation, thus indicating the exact energy of rotation.

Momentum (mō-men'tum), the quantity of motion of a moving body, measured as the product of the body's mass and its velocity. The unit quantity of momentum most commonly employed is that possessed by a body of the mass of 1 lb. moving with a velocity of 1 foot per second. The C.G.S. unit (see *Dynamics*) is the momentum possessed by a body of the mass of 1 gramme moving with a velocity of 1 centimeter per second.

Mommsen (mom'sen), THEODOR, a German scholar and historian, born in 1817. He was appointed professor of jurisprudence at Leipzig in 1848, professor of Roman law at Zürich in 1852; obtained a similar chair at Breslau in 1854; in 1858 went to Berlin as professor of ancient history. His best-known work is a history of Rome, which has been translated into English; but he has also published many other works on Roman history, law, and antiquities. He died in 1903.

Mömpelgard. See *Montbéliard.*

Mompox (mom-pōks'), MOMPOS, a town of Colombia, on the Magdalena, 125 miles south of Baranquilla. Founded in 1538, it was at one time of considerable commercial importance, but the capricious changes of the river's course have seriously injured its prosperity. Pop. 10,000.

Momus (mō'mus), the god of mockery and censure among the ancients was the son of Night. He was expelled from heaven for his free criticism of the gods. Momus is generally represented raising a mask from his face, and holding a small figure in his hand.

Mona (mō'na), the ancient name of the island of Anglesea and the Isle of Man.

Mona (*Cercopithēcus mona*), a monkey, sometimes called the *variegated monkey*, because its fur is varied with gray, red, brown and green. It is often brought to Europe, and is easily tamed.

Monachism (mon'a-kizm). See *Monastery* and *Orders* (*Religious*).

Monaco (mon'a-kō), a principality lying between the French department Alpes Maritimes (Nice) and the Mediterranean. In 1861 the Prince of Monaco sold the departments of Mentone and Roccabruna to France for 4,000,000 francs; and the principality has since then been confined to an area of about 8 square miles, with a pop. of about 15,180. The prince (a scion of the house of Grimaldi) exercises both legislative and executive functions, while the people are exempt from taxation, as the revenue is almost entirely derived from the rents of the gaming establishment. The capital, Monaco (pop. about 3292), situated on a rocky height projecting into the sea, is a renowned watering-place. About a mile to the E. is Monte Carlo, a collection of hotels and villas which have sprung up near the luxurious gardens of the handsome gambling casino, established here in 1860. This institution is now the property of a joint-stock company. The inhabitants of Monaco (*Monégasques*) are not admitted to the gaming tables.

Monad (mon'ad), in philosophy, an imaginary entity in the philosophy of Leibnitz, according to whom monads are simple substances, of which the whole universe is composed, each differing from every other, but all agreeing in having no extension, but in being possessed of life, the source of all motion and activity. Every monad, according to Leibnitz, is a soul, and a human soul is only a monad of elevated rank.

Monad, the term applied to certain minute infusorial organisms of

a low type of organization, consisting each of a little speck of protoplasmic matter furnished with a vibratile filament or *cilium*, and making their appearance in putrescent fluids.

Monaghan (mon'a-gan), a county of Ulster, Ireland, area 497 sq. miles. The surface is hilly, and abounds with small lakes and bogs. Monaghan is the county town. Agriculture and the manufacture of linen are the chief industries. Pop. 74,611.

Monarchianism (mo-när'ki-an-izm), a name given to the tenets of those who, before and during the 3rd century A. D., opposed the rapidly developing doctrine of the Trinity as endangering or violating the *monarchia* (unity and supremacy) of God. They are usually divided into two classes: (1). Dynamistic or Adoptionistic Monarchians, who regarded Jesus as a human personality, 'adopted' by the Father. (2) The Modalistic or Patripassian Monarchians, who rationalized the Trinity as but the modes in which God revealed himself.

Monarchy (mon'ar-ki) is a state or government in which the supreme power is either actually or nominally vested for life in a single person, by whatever name he be distinguished. A monarchy in which the subjects have no right or powers as against the monarch is termed *despotic* or *absolute;* when the legislative power is wholly in the hands of a monarch, who, however, is himself subject to the law, it is termed *autocratic;* but when the monarch shares the power of enacting laws with representatives of the people, the monarchy is *limited* or *constitutional* (*e.g.*, Great Britain). In ancient Greece, a monarchy in which the ruler either obtained or administered his power in violation of the constitution was termed a *tyranny*, however beneficent the rule might be.

Monastery (mon'as-tèr-i), a house into which persons retire from the world to lead a life devoted to religion. The practice of monachism or monastic seclusion, though it has been carried to its greatest development within the Christian Church, had its origin in periods long anterior to the Christian era, and has long flourished in countries where Christianity has little or no influence, as among the Brahmans and Buddhists. Christianity was probably not without its ascetics even from the first, but it was not until the close of the third century, when the Neo-Platonic and Gnostic doctrines of the antagonism between body and soul had gained strength, that solitary life began to be specially esteemed. The foundation of the first Christian monasteries is ascribed to Anthony the Great, who about 305, in the deserts of Upper Egypt, collected a number of hermits, who performed their devotional exercises in common. His disciple Pachomius, in the middle of the fourth century, built a number of houses not far from each other, upon the island of Tabenna, in the Nile, each of which was occupied by three monks (*syncelli*) in cells, who were all under the superintendence of a prior. These priors formed together the *cœnobium*, or monastery, which was under the care of the abbot, hegumenos or mandrite, and were obliged to submit to uniform rules of life. At the death of Pachomius, after 348, the monastic colony at Tabenna amounted to 7000 persons. His *rule* or monastic system continued to spread rapidly, reaching even Italy, where it was introduced by Athanasius, and thence extending to other western lands, until it was there superseded by the rule of St. Benedict. In the East it finally gave way to the rule of St. Basil, founded about 375.

Under the Pachomian rule there was not anything more than a tacit renunciation of the world. St. Basil imposed a stricter discipline upon the monasteries that embraced his rule; but Western monasticism, which rapidly spread during the fifth century, was accompanied by many irregularities, until monastic vows were introduced in the sixth century by St. Benedict. The monasteries of the West now became the dwellings of piety, industry, and temperance, and the refuge of learning. Missionaries were sent out from them; deserts and solitudes were made habitable by industrious monks; and in promoting the progress of agriculture and converting the German and Slavonic nations they certainly rendered great services to the world from the sixth century to the ninth. Another incalculable benefit conferred upon civilization by the monasteries is the preservation of nearly the whole of the classic and mediæval MS. literature that we possess.

But monasteries changed their character, to a great degree, as their wealth and influence increased. Idleness and luxury crept within their walls, together with all the vices of the world, and their decay became inevitable, when, by a custom first introduced by the Frankish kings, and afterwards imitated by other princes, they came under the care of lay abbots or superiors, who, thinking only of their revenues, did nothing to maintain discipline among the monks and nuns. These being left wholly to their own government by the bishops, originally their overseers, soon lost their monastic zeal. A few only,

by means of the convent schools (founded by Charlemagne for the education of the clergy), as, for instance, those at Tours, Lyons, Rheims, Cologne, Trèves, Fulda, etc., maintained their character for usefulness till the ninth and tenth centuries. The monastery at Cluny, in Burgundy, first led the way to reform. This was founded in the year 910, under Berno, was governed by the rules of St. Benedict, with additional regulations of a still more rigid character; and attained the position, next to Rome, of the most important religious center in the world. Many monasteries in France, Spain, Italy and Germany were reformed on this model, and the Benedictine rule now first became prominent in Britain through the instrumentality of Dunstan. The Celtic and other monasteries of Britain and Ireland heretofore seem to have had an independent historical connection with the early monachism of Egypt. The reforming spirit also gave birth to so many new orders or modifications of the Benedictine rule (such as the Carthusians and Cistercians), that in 1215 the Lateran Council forbade the formation of any new order. The prohibition, however, was not obeyed. The three great military orders (Templars, Hospitallers and Teutonic Knights) were founded in the twelfth century; while the famous mendicant orders of the Franciscans and Dominicans date from the thirteenth. With the reputation of renewed sanctity the monasteries acquired new influence and new possessions. Many of them ('exempt monasteries') released themselves from all superintending authority except that of the pope, and acquired great wealth in the time of the Crusades from the estates of Crusaders and others placed under the protection of their privilege of inviolability, or even left to them in reversion. But with this growing influence the zeal for reformation abated; new abuses sprang up, and the character of each monastery came, at last, to depend chiefly upon that of its abbot.

The number of monasteries was much diminished at the time of the Reformation, when the rich estates of those in Protestant states were in part appropriated by the sovereign to his own use, in part distributed to nobles and ecclesiastics, and in part devoted to educational and benevolent purposes. In Catholic countries this period was marked by a revival of the spirit of monastic reform; while many new orders were founded whose objects were more directly practical (teaching, tending the sick, visiting the poor) than those of the older and more contemplative orders. Monachism, however, as belonging to the older system of things, was regarded with hostility by the spirit of rationalism and liberalism which found decisive expression in the French Revolution; and during the eighteenth century the monastic orders were obliged, as the papal power diminished, to submit to many restrictions imposed upon them by Catholic princes, or to purchase immunity at a high price. In 1781 the houses of some orders were wholly abolished by the Emperor Joseph II, and those suffered to remain were limited to a certain number of inmates, and cut off from all connection with any foreign authority. In France the abolition of all orders and monasteries was decreed in 1789, and the example was followed by all the states incorporated with France under the protection of Napoleon I. In the nineteenth century, however, under Napoleon III, and during the early years of the republic, monachism prospered in France, though since 1880 only monasteries authorized by the state are permitted to exist. In Germany all orders except those engaged in tending the sick were abolished in 1875. The unification of Italy was followed by a series of decrees pronouncing all monastic orders illegal. In Portugal monasteries were abolished by decree in 1834, and in Spain in 1837. A severe attack was made on them in Portugal in the revolution of 1910. In Russia the number of such institutions is strictly limited by law. In the states of South America the same policy of abolition has been adopted; whereas in the United States and Canada several orders have made considerable progress. Protestantism has never favored monachism, but in the Episcopal churches of England and America 'sisterhoods' and 'brotherhoods' (especially the former) have been formed at various times, generally with some philanthropic or charitable object. In the Eastern or Greek Church all nuns and the great majority of monks belong to the Basilian order. Some monasteries, including the famous monastery of Mount Sinai, obey the rule of St. Anthony. Monastic institutions for women, usually spoken of as convents or nunneries, date in their earliest form from about the middle of the third century. (See *Nun*.) For the monastic vows see the next article; for further information, see *Orders (Religious)*, *Abbey*, etc.

Monastic Vows (mon-as'tik vous) are three in number—poverty, chastity and obedience. The vow of poverty prevents the monks from holding any property individually. Monasteries, however, professing merely the 'high' degree of poverty may possess

real estate, yet not more than enough for their support, as the Carmelites and Augustines. In the 'higher' degree a monastery may hold only personal property, as books, dresses, supplies of food and drink, rents, etc., as the Dominicans. The 'highest' degree absolutely forbids both real and personal property, as is the case with the Franciscans, and especially the Capuchins. The vow of chastity requires an entire abstinence from familiar intercourse with the other sex; and that of obedience entire compliance with the rules of the order and the commands of the superior.

Monastir (mon-as-tēr'), or BITOLIA, a city of southern Servia, captured from Turkey in the Balkan war; 87 miles W. N. W. of Salonica. It is an active manufacturing city. Pop. 60,000.

Monazite (mon'a-zit), an anhydrous phosphate of cerium, lanthanum, didymium and thorium; found in gravel deposits in N. and S. Carolina and elsewhere. These salts are among the most refractory substances known and therefore of much value in making incandescent gas mantles.

Moncalieri (mon-kä-lyā're), a community of Italy, on the Po, 5 miles S. of Turin. Matches and bricks are made. Pop. 12,000.

Moncton (munk'tun), a city of New Brunswick, Canada, on the Canadian Pacific R. R., 89 miles N. E. of St. John. It is at the head of navigation on the Petitcodiac River, has a good harbor and manufactures of wooden ware, stoves, cotton and woolen goods, etc. Pop. (1911) 11,345.

Monday (mun'dā; that is, *moon-day;* Anglo-Saxon, *Monandœg;* German, *Montag*), the second day of our week, formerly sacred to the moon.

Mondonedo (mon-dōn-yā'do), a cathedral city near the northwest corner of Spain, province Lugo. Pop. about 10,590.

Mondovi (mon-dō'vi), a town in N. Italy, province of Cuneo, 33 miles west of Genoa. It is walled and defended by a dilapidated citadel. It has a fine cathedral. Pop. 19,000.

Monessen, a borough in Westmoreland county, Pennsylvania, on the Monongahela River. It has manufactures of steel and iron. Pop. 19,000.

Monet (mō-nā'), CLAUDE, French impressionist painter, was born in Paris in 1840. He studied art for some time in the studio of Gleyre, and in 1869 joined the group of Cézanne, Degas, Duranty, Sisley, and became a *plein air* painter, excelling in the delineation of subtle gradations of light.

Money (mun'i), in its ordinary sense, is equivalent to pieces of metal, especially gold and silver, duly stamped and issued by the government of a country to serve as a legalized standard of value. In this sense it is more precisely designated *metallic* money, to distinguish it from *paper* money, from which latter it is also distinguished by having an intrinsic value. A few particulars regarding money may here be given as supplementary to information contained in the articles *Currency, Coining, Bank,* etc. The sovereign and half sovereign are the legal metal standard of value in the United Kingdom and most of the British colonies, and the gold dollar in the United States. By the Latin Monetary Convention, which includes France, Belgium, Italy, Switzerland and Greece, it has been agreed that the gold napoleon and the silver five-franc piece—or corresponding pieces—are to be exchangeable throughout these countries as their standard money; while by the Scandinavian Monetary Convention, which includes Norway, Sweden and Denmark, the gold 20-kroner and 10-kroner pieces are the standard coins. These contracting states have thus agreed to issue no gold or silver coins except of a certain weight, fineness, and diameter. In Germany the 5-mark, 10-mark, and 20-mark pieces are the standard units; while in Austria the silver florin, and in Russia the silver rouble, are the recognized standard coins. *Moneys of account* are those denominations of money in which accounts are kept, and which may or may not have a coin of corresponding value in circulation. The money unit in various countries is as follows: United States and Canada, the dollar; Britain, Australia and S. Africa, the pound; Belgium, France, Switzerland, the franc; Germany, the mark; Austria, Czechoslovakia, Sweden, Denmark, Norway, Hungary, the krone; Serb-Croat-Slovene State (Jugo-Slavia), the dinar; Russia, the rouble; Italy, lira; Netherlands, florin; Portugal, Peru, libra; Spain, peseta; Turkey, piastre; Greece, drachma; India, rupee; Japan, yen; China, tael; Philippines, Mexico, Argentine, Chile, Uruguay, Cuba, peso; Bolivia, boliviano; Brazil, milreis; Venezuela, bolivar.

Monge (monzh), GASPARD, a French mathematician and natural philosopher, born in 1746; died in 1818.

Monghyr, or MONGHIR (mon-gēr'), a district and town of India, in Bengal. The district, which has an area of 3921 sq. miles, is intersected from east to west by the Ganges. The town stands on the Ganges, 80 miles east of

Patna. It is of considerable antiquity, and has a fort which now contains the public buildings and the bungalows of the European residents. Monghyr, owing to the salubrity of its climate, is a favorite residence of invalid military men and their families. Pop. (1911) 46,913.

Mongolia (mon-gō'li-a), a vast region of the northeast of Asia, belonging to the Chinese Empire, is situated between China proper and Asiatic Russia; estimated area, 1,400,000 sq. miles. It is in great part an extended plateau, lying at an elevation of 2500 to 3500 feet. A great part of it is occupied by the Desert of Gobi or Shamo, and on or near its borders are lofty mountain chains, the principal of which are the Altai, the Sayansk, the Khinghan and the Inshan. The inhabitants (estimated at 5,000,000) lead a nomadic life. They possess large herds of cattle, sheep and horses. The climate is in sections intensely hot in summer and bitterly cold in winter.

Mongols, a race of people in the northeast of Asia, whose original seat seems to have been in the north of the present Mongolia, and in Siberia to the southeast of Lake Baikal. Their first great advance was due to Genghis Khan, who having been, originally, merely the chief of a single Mongol horde, entered upon a career of conquest, compelled the other hordes to submit to his power, and then, in 1206, conceived the bold plan of conquering the whole earth. (See *Genghis Khan.*) After the death of Genghis Khan, in 1227, his sons and grandsons pursued his conquests, subjugated all China, subverted the caliphate of Bagdad (1263), and made the Seljuk sultans of Iconium tributary. In 1237 a Mongol army invaded Russia, devastated the country with the most horrible cruelty, and from Russia passed, in two divisions, into Poland and Hungary. At Pesth the Hungarian army was routed with terrible slaughter, and at Liegnitz, in Silesia, Henry, duke of Breslau, was defeated in a bloody battle, April 9, 1241. The Mongols were recalled, however, from their victorious career by the news of the death in December, 1241, of Ogdai, the immediate successor of Genghis Khan. The empire of the Mongols was at the summit of its power during the reigns of Mangu Khan (1251-59) and Khubilai, or Kûblai Khan (1259-94), the conqueror of China and the patron of Marco Polo. At that time it extended from the Chinese Sea and from India far into the interior of Siberia, and to the frontiers of Poland. The principal seat of the *khakan* or great khan was transferred by Khubilai from Karahorum to China; the other countries were governed by subordinate khans, all of whom were descended from Genghis, and several of whom succeeded in making themselves independent. This division of the empire was the cause of the gradual decay of the power and consequence of the Mongols in the fourteenth century. The adoption of new religions (Buddhism in the east and Mohammedanism in the west) also contributed to their fall. In 1368 the empire of the Mongols in China was overturned by a revolution which set the native Ming dynasty on the throne. Driven northwards to their original home, the eastern Mongols remained for a time subject to the descendants of Genghis Khan, but gradually splitting up into small independent tribes, they finally were subdued and absorbed by the Manchu conquerors of China. Of the western Mongols the most powerful were the Kipchaks, or Golden Horde, who lived on the Volga, and the khanate founded in Bokhara, on the Oxus, by Jagatai, the eldest son of Genghis Khan. The former gradually fell under the power of the Russians; but among the latter there appeared a second formidable warrior, Timurlenk (Tamerlane), called also Timur Beg. In 1369 he chose the city of Samarcand for the seat of his new government, the other Mongol tribes, with Persia, Central Asia and Hindustan, being successively subjugated by him. In 1402, at Ancyra (Angora), in Asia Minor, he defeated and captured the Sultan Bajazet I, who had been hitherto victorious against the Christians in Europe, and before whom Constantinople trembled. After Timur's death, in 1405, his empire barely held together until 1468, when it was again divided. Baber (Babur), a descendant of Timur, founded in India, in 1519, the empire of the Great Mogul, which existed in name till 1857, though its power ended in 1739. (See *India.*) After the commencement of the sixteenth century the Mongols lost all importance in the history of the world, became split up into a number of separate khanates and tribes, and fell under the power of the neighboring peoples. Their name still lingers in the Chinese province of Mongolia (see above), but Mongolian tribes are found far beyond its boundaries.

The term Mongolians or Mongolidæ is to some extent used by anthropologists to signify a very large division of the races of men, of which the Mongols proper were considered typical. This use of the name, which includes Tartars, Turks, Finns, Chinese and Japanese, is to be carefully distinguished from the historical use.

Mongoose. See *Mungoose.*

Monica (mon'i-ka), St., mother of St. Augustine, was born in Africa, of Christian parents, in 332. The grief of her life was the worldliness and long heresy of her great son; but she was miraculously assured by a dream of his conversion, and was informed by an aged bishop that 'the child of so many tears could not be lost.' With her other son, Navigius, she followed Augustine to Italy, where she died May 4, 387, at Ostia. Her festival is May 4.

Monier-Williams (m ō' n i -ėr-wil'-lamz), Sir Monier, orientalist, born in 1819 at Bombay, where his father, Col. Monier-Williams, held the post of surveyor-general. He was graduated at King's College, London, and Baliol and University colleges, Oxford. He was professor of Sanskrit at Haileybury from 1844 to 1858, and in 1860 became Boden Sanskrit professor at Oxford. His writings include a grammar and a dictionary of Sanskrit, *Hinduism, Modern India, Religious Thought and Life in India,* etc. He traveled extensively in India, and was knighted in 1886. He died in 1899.

Monism (mon'izm), the doctrine that there is only one ultimate principle of being instead of two—mind and matter—as held in *dualism.* Monism may be *idealistic,* explaining matters as a modification of mind, or *materialistic,* explaining mind as an outcome of material energy, or *pantheistic,* referring matter and mind to one original substance.

Monitor (mon'i-tur), the type of a family of lizards (Varanidæ). They are the largest of the Lizard order. some species, such as the *Varanus Niloticus* of the Nile and Egypt, attaining a length of 6 feet. They generally inhabit the neighborhood of rivers and lakes, and feed upon the eggs of crocodiles, turtles, and those of aquatic birds. The name is owing to the belief formerly entertained that these lizards gave warning of the approach of crocodiles.

Monitor, the popular name for a class of very shallow, heavily-armed iron-clad steam-vessels lying very low in the water and carrying on their open decks either one or two revolving turrets, each containing one or more enormous guns, and designed to combine the maximum of gun-power with the minimum of exposure. Monitors are so called from the name of the first vessel of the kind, invented and built in New York by John Ericsson at the beginning of the Civil war, and indicating its powers in the famous engagement with the *Merrimac* in 1862, the first battle between iron-clad war vessels.

Monk (mungk), a man who retires from the world to live in a monastery as member of some religious order. Originally all monks were laymen, but after about the eighth century the superiors, and by degrees other members, were admitted to holy orders. See *Monastery* and *Orders* (*Religious*).

Monk, George, Duke of Albemarle, an English general, famous for the prominent part he took in the restoration of Charles II, was born in 1608. At the age of seventeen he volunteered as a private soldier in the expedition to Cadiz. In the struggle between Charles I and the parliament he at first joined the royalists and was taken prisoner. After the capture of the king Monk took the Covenant and regained his liberty, in 1646. Under the parliament he served in Ireland, and

General Monk.

subsequently with Cromwell in Scotland, and in 1650 he reduced that country to obedience within a few weeks. In 1653 he assisted Admiral Dean in inflicting two severe naval defeats on the Dutch under Van Tromp the elder. Next year he was placed at the head of the English army in Scotland, and he was still in this position at the death of the Protector and at the resignation of his son in 1659. Monk had always been regarded with hope by the royalist party, and he seems to have decided at once upon the restoration, although he used dissimulation and deceit to avoid committing himself either one way or the other until he was tolerably sure of success. The coming over of Charles II was arranged with Monk, and the king rewarded his restorer with the dukedom of Albemarle, the order of the Garter, and with a pension of £7000 a year. Monk now fell into comparative

obscurity. In 1666, however, he once more served against the Dutch at sea, defeating Van Tromp the younger and De Ruyter. He died in 1670, and was buried in Westminster Abbey.

Monkey-bread. See *Baobab.*

Monkey-cup, a name applied to the pitcher-plants.

Monkey-pot, the name given to the fruit of *Lecythis ollaria,* a large Brazilian forest tree. It consists of a hard capsule furnished with a lid, and containing seeds of which monkeys are fond.

Monkey (mung'ki), the popular name applied sometimes to the whole of Cuvier's mammalian order Quadrumana, sometimes limited to those of the order that have tails, and generally cheek pouches, to the exclusion of the apes, baboons and lemurs. The general characters of the mammals of this order are found in the great toe being opposable to the other digits of the foot, so that the feet seem to be converted into 'hands.' The hallux or thumb may be absent, but when developed it is generally opposable to the other fingers; and the animals are thus claimed to possess 'four hands,' or are 'quadrumanous.' This supposed anatomical distinction from man is not maintained by later naturalists. The monkeys may all be divided into a lower and a higher section. The higher section is that of the *Catarhina* (Greek, *kata,* downwards, and *rhines,* nostrils) or Old World monkeys. The catarhine monkeys are distinguished by their obliquely-set nostrils, the nasal apertures being placed close together, and the nasal septum being narrow. Opposable thumbs and great toes exist in nearly all. The tail may be rudimentary or wanting, but in no case is it prehensile. Cheek-pouches, which are used as receptacle for food preparatory to its mastication, are present in many; and the skin covering the prominences of the buttocks is frequently destitute of hair, becomes hardened, and thus constitutes the so-called *natal callosities.* The catarhine monkeys inhabit Asia and Africa. They include the anthropoid or man-like apes; the gibbons, the orang, the chimpanzee and the gorilla; also the baboons and mandrills, the sacred monkey of the Hindus, the proboscis monkey, the Diana monkey, the mona, the wanderoo, etc. The lower section of monkeys consists of the *Platurhina* (Greek, *platys,* broad; *rhines,* nostrils), or New World monkeys, which are entirely confined to South America. They have the nostrils widely separated, the septum or partition between being broad, hence the name. Another peculiarity consists in their prehensile tails; and there are none of the cheek-pouches or hard callosities on the rump so characteristic of Old World monkeys. The diet is especially of a vegetable nature. This section includes the marmosets, the spider-monkeys, the capuchin monkeys, the squirrel-monkeys, the howling monkeys, etc. See *Apes, Baboons,* etc.

Monk-fish. See *Angel-fish.*

Monk-seal. See *Seal.*

Monk's-hood. See *Aconite.*

Monmouth (mon'muth; Welsh, *Mynwy*), a borough of England, the county town of Monmouthshire, is situated in a beautiful valley at the confluence of the Monnow and Wye. The Monnow is here spanned by an ancient stone bridge, and the Wye by a modern one. Monmouth has malleable iron and tin-plate works, paper and corn mills, etc. The castle, of which only fragments remain, was a favorite residence of John of Gaunt, and the birthplace of Henry V. Monmouth, with Newport and Usk, sends a member to parliament. Pop. 5269.—The county lies north of the Bristol Channel and the estuary of the Severn; area 535 sq. miles. A considerable portion of the surface is mountainous and rocky, the remainder consisting of fertile valleys and gentle slopes. The chief rivers are the Wye, the Monnow, the Usk, the Ebbw, and the Rhymney. The production of coal and iron is extensive. Pontypool, Blaenavon, Tredegar, Ebbw, Vale and Rhymney are the headquarters of the coal and iron industries. The manufacture of tin-plate is also extensively carried on. Among the antiquities of the county are remains of Llanthony and Tintern Abbeys, and the fine Norman castle of Chepstow. Pop. 395,778.

Monmouth, JAMES, DUKE OF, the natural son of Lucy Walters, one of the mistresses of Charles II, was born at Rotterdam in 1649, and was always acknowledged by Charles as his natural son, though there were doubts of his paternity. After the Restoration he was created Duke of Orkney and Duke of Monmouth (1663), married the daughter and heiress of the Earl of Buccleuch, and received the Garter. His handsome person, affable address, and distinguished valor obtained him much popularity, but his education was defective, and his capacity mean. It was reported that the king had been privately married to Lucy Walters, and the popular dislike of the Duke of York, afterwards James II, joined with the fact of

Monmouth being a Protestant, gave occasion to hopes that her son might succeed to the crown, though the king expressly declared that the Duke of Monmouth had no claims to legitimacy. In 1679 Monmouth was intrusted with a command in Scotland, and defeated the Covenanters at the battle of Bothwell Bridge, June 22, but was soon afterwards sent beyond seas at the instigation of his uncle. A few months afterwards he returned without leave, and became the center of the popular movement in which the lives of Lord William Russell and Algernon Sidney were sacrificed. The result to Monmouth was his exile in Holland. On the accession of James II he was induced to attempt an invasion of England. He arrived at Lyme Regis with less than a hundred followers (June 11, 1685), but his numbers were soon increased. He proclaimed James the poisoner of the late king, and asserted the legitimacy of his own birth; but from the first there was no likelihood of his success. His small body of undisciplined troops were totally defeated at Sedgmoor, and the duke himself was captured and beheaded July 15, 1685, after abject appeals to the king for mercy.

Monmouth, a city of Illinois, capital of Warren County, 15 miles w. by s. of Galesburg. Coal is found in the vicinity and it has manufactures of pottery and sewer pipe, ploughs, soap, cigars, etc. Here is Monmouth College (United Presbyterian). Pop. 9128.

Monochord (mon'u-kord), a musical instrument with one string, much employed by the ancients in the musical training of the voice and ear. The string, stretched over a board or sounding-box, emits a musical note on being caused to vibrate. The length of the vibrating part of the string may be altered at will by means of a movable bridge, and the relative pitch of the different notes thus produced compared. A modified, or rather developed, form of the instrument is employed to exhibit the law of vibrating strings, and also to illustrate the relations of harmonies and the fundamental ideas of undulations.

Monochrome (mon'u-krōm), a painting executed in a single color. This description of art is very ancient, and was known to the Etruscans. The most numerous examples existing of this kind of painting are on terra cotta. A painting, to be a proper monochrome, must have the figures relieved by light and shade.

Monocotyledon (mon-ō-kot-i-lē'don), a plant with only one cotyledon or seed-lobe. The Monocotyledons form one of the two great classes into which the phanerogamons or flowering plants are divided. See *Endogenous Plants, Botany.*

Monodelphia (mon-u-del'fi-a), one of the three subclasses into which mammals were divided by De Blainville in 1816 in accordance with the nature of their reproductive organs, the other two classes being Ornithodelphia and Didelphia. The Monodelphia are characterized by the fact that the uterus or womb is single, and shows a single uterine cavity. This subclass corresponds with the 'Placental' mammals, and includes all the Mammalia except the monotremes and marsupials.

Monœcious (mu-nē'shus), in botany, having male flowers and female flowers on the same individual plant; opposed to *dioecious.*

Monogram (mon'u-gram), a character or cipher composed of one, two, or more letters interwoven, and used as a sign or abbreviation of a name or word. The use of monograms was common among the Greeks and Romans, and the art of combining and contorting letters and words flourished universally in the middle ages. The term is now applied to conjoined initials of a personal name on seals, trinkets, letter-paper and envelopes, etc., or employed by printers, painters, engravers, etc., as a means of distinguishing their work.

Monograph (mon'u-graf), a work in which a particular subject in any science is treated by itself, and forms the whole subject of the work. Monographs have contributed much to our knowledge, especially in the department of the natural sciences.

Monolith (mon'u-lith), a pillar, statue, or other large object cut from a single block of stone. The obelisks of Egypt are well-known examples.

Monomania (mon-u-mā'ni-a), the name given by some physicians to that form of mania in which the mind of the patient is absorbed by one morbid idea or impulse and the person seems to be insane only in one direction. Dipsomania and kleptomania are regarded as two varieties of monomania.

Monometallism (mon-u-met'al-izm), the principle of having only one metallic standard in the coinage of a country; opposed to *bimetallism.*

Monongahela (mō-non-ga-hē'la), a river of the United States, formed by the union of West Fork and Tygart's Valley in West Virginia,

runs north into Pennsylvania, and unites with the Allegheny, at Pittsburgh, to form the Ohio. The main stream is 125 miles long; navigable.

Monongahela (mo-non-ga-hē'la), a city of Washington Co., Pennsylvania, on Monongahela River, 31 miles S. of Pittsburgh, on Pennsylvania and Pittsburgh & Erie railroads. It has coal mines, steel mills, chemical works, foundries, spring and axle works, paper mills, etc. Pop. (1920) 8688.

Monopetalous (mon-u-pet'a-lus), in botany, having the petals united together into one piece by their edges; otherwise called *gamopetalous.*

Monophysites (mu-nof'i-sīts), those who maintained that there was but one nature in the incarnate Christ, that is, that the divine and human natures were so united as to form but one *nature,* yet without any change, confusion, or mixture of the two natures. They were condemned as heretics by the Council of Chalcedon in 451. The Eastern and Egyptian clergy were inclined to the Monophysite doctrine, while the Western church contended for the decree of the council. After long and often bloody contests, the orthodox church succeeded in overawing the heresy in the first half of the sixth century. In Egypt, Syria and Mesopotamia the Monophysite congregations, however, remained the strongest, had patriarchs at Alexandria and Antioch, existing, without interruption, by the side of the imperial orthodox patriarchs; and after Jacob Baradæus, had, about 570, established their religious constitution, formed the independent churches of the Jacobites and Armenians, which have maintained themselves ever since. The Coptic Christians of Egypt and the Abyssinian Church are also Monophysites in doctrine.

Monoplane (mon'o-plān), an aeroplane, or heavier than air flying machine, which has a single gliding board, in distinction to the *Biplane,* or double-plane machine. See *Aeroplane.*

Monopoli (mo-nop'ō-lē), a seaport of South Italy, on the Adriatic, in the province and 25 miles E. S. E. of Bari. It has a cathedral, manufactures of woolen and cotton cloth, and a trade in wine and olives. It is the residence of an archbishop. Pop. 22,616.

Monopoly (mu-nop'o-li) is an exclusive right, conferred by authority on one or more persons, to carry on some branch of trade or manufacture. The monopolies most frequently granted were the right of trading to certain foreign countries, of importing or exporting certain articles, or of exercising particular arts or trades. The entire trade and industry of the middle ages was characterized by attempts to erect and maintain monopolies, as evidenced by the trade-guilds and such associations as the Hanseatic League. The discovery of the New World only provided a fresh sphere for the same system; for not only did every government endeavor to monopolize the trade of its colonies, but in nearly every case the new countries were opened up by privileged 'adventurers' and jealous monopoly companies. The granting of monopolies has at all times been opposed to the spirit of English common law, but the practice was very common previous to the accession of the Stuarts. The abuse reached its height under Elizabeth. In most countries there are certain so-called government monopolies maintained on various grounds of public policy. Examples of such monopolies are the postal and telegraph service, the tobacco monopoly in France, the opium monopoly in India, the salt monopoly in Italy, etc. The only government monopoly in the United States is the Post Office. Patents and copyrights granted to individuals are monopolized during the term of their existence. There are also numerous quasi-monopolies, such as those enjoyed by railway, water, and gas companies, and similar semipublic organizations. The monopolies known as trusts, or business organizations, are viewed with great disfavor by the people, and laws have recently been passed to control their operations, and in some instances, where they seemed in illegal restraint of trade, their dissolution has been decreed.

Monorail (mon'u-rāl), a railway consisting of a single rail. Two types of these are in use: (1) An overhead rail, from which the car hangs, with a wheel running on the rail. (2) The gyroscope railway, in which the car is kept erect on a single rail by the use of revolving gyroscopes. See *Gyroscope Railway.*

Monosepalous (mon-u-sep'a-lus), in botany, having the sepals united together into one piece by their edges; otherwise called *gamosepalous.*

Monotheism (mon'ō-thē-izm), the belief in, and worship of, a single, personal God; opposed to polytheism and distinct also from pantheism. It was at one time the received opinion that monotheism was the primeval intuitive form of religion, but most recent authorities now hold that it was everywhere posterior to polytheism, whence it was evolved by a gradual education. *Henotheism,* which Max Müller and Schel-

ling maintain to be the primeval form, is merely the rudimentary phase of polytheism in minds not yet conscious of the complexity of the problems for which polytheism is suggested as the solution by more developed intellects. The three great modern monotheistic religions are Judaism, Christianity, and Mohammedanism. The Jewish prophets had a firm persuasion of one God, the Father and Judge of all; but they are continually upbraiding the people for lapsing into polytheism. After the Babylonish captivity the people became fixed in their belief. Christian monotheism is, of course, historically a development of Hebrew monotheism; and Mohammed probably borrowed the doctrine from the same source. Both Jew and Mohammedan regard the Trinitarian conception of Deity as a deviation from the pure doctrine of monotheism.

Monothelites (mo-noth'e-lits), a sect of heretics who maintained that Christ had but *one will* (Gr. *monos*, single, *thelein*, to will). Their doctrine was the logical extension of the heresy of the Monophysites, who were all Monothelites. The sect rose into prominence in the seventh century, but a synod of the Lateran formally adopted the opposite doctrine of dyothelism, which has since been the orthodox doctrine in both the Western and the Eastern churches. The heresy, which at once caused a great commotion in the church, gradually became extinct except in the Monophysite churches.

Monotremata (mon-u-trē'ma-ta), the lowest subclass of Mammalia, corresponding to the *Ornithodelphia* of De Blainville, having only one common cloacal outlet for the fæces and the products of the urino-genital organs, in this respect as well as others, noticeably in producing eggs, resembling birds. The jaws have no teeth, at most having horny plates which serve the same purpose. There are no external ears. This subclass includes but two genera, *Ornithorhynchus* and *Echidna*. The former has but one species, the *Ornithorhynchus paradoxus*, or duck-billed watermole of Australia; the latter genus includes two species, the *Echidna hystrix*, or porcupine ant-eater of Australia, and the *E. setosa* of the same country. See *Ornithorhynchus* and *Echidna*.

Monotype (mon'o-tip), a system for casting and setting type by machine, setting each character separately. See *Typesetting Machines*.

Monreale (mon-rā-ā'lā), or MORREALE, a town in Sicily, in the province and 5 miles w. s. w. of Palermo. It originally sprang up around the magnificent cathedral and Benedictine convent founded here in the beginning of the twelfth century by the Norman Prince William II. Pop. (commune) 23,778.

Monro (mon-rō'), ALEXANDER, distinguished as 'Primus' or first, anatomist and founder of the Edinburgh Medical School, was born in London in 1697; died in 1767; studied in Edinburgh, afterwards in London under Cheselden, in Paris under Bouquet, and at Leyden under Boerhaave. After his return in 1719 he became demonstrator in anatomy and surgery in Edinburgh University, and in 1725 obtained the chair of anatomy and surgery. He took an active part in promoting the erection of Edinburgh Infirmary. His principal works are *Osteology, a Treatise on the Anatomy of the Human Bones and Nerves;* and an *Essay on Comparative Anatomy* (1733-47).—His son (1738-1817), ('Secundus') succeeded to his chair in 1759.—ALEXANDER MONRO ('Tertius'), son of the latter, succeeded in 1808.

Monroe, a city, county seat of Monroe Co., Michigan, on the Raisin River, 35 miles s. s. w. of Detroit. It has extensive paper mills, nurseries, foundries, flour mills, glass works, box and furniture factories and other industries. Also known as a summer resort. Pop. (1910) 6893; (1920) 11,573.

Monroe, a city, parish seat of Ouachita Parish, Louisiana, on the Ouachita River, 76 miles w. of Vicksburg. It has a large trade in cotton, and has large oil mills, cotton compresses, and several hardwood lumber mills. It is surrounded by rich alluvial agricultural lands. Pop. (1910) 10,209; (1920) 12,675.

Monroe (mon-rō'), JAMES, fifth President of the United States of America, was born in 1758 in Westmoreland county, Virginia; died at New York in 1831. He was educated at William and Mary College, and from 1776 till 1778 served in the Revolutionary army. He then devoted himself to the study of law. In 1782 and in 1787 he was elected a member of the Virginia Assembly, and from 1783 till 1786 he represented Virginia in Congress. In 1788 as a member of the Convention of Virginia he strenuously opposed the ratification of the new Federal constitution. In 1790 he was elected to the Senate of the United States. In 1794-96 he was minister plenipotentiary to France. From 1799 till 1802 he was governor of Virginia, and in 1803 he returned as envoy-extraordinary to France on a mission which resulted in the acquisition of Louisiana for $15,000,000. He was afterwards employed on diplomatic

service in England and Spain. In 1811 he was governor of Virginia; in 1811-17 he was Secretary of State, being also Secretary of War in 1814-15. In 1816 the Democratic Republican party elected him to the presidency of the United States. The Federalist party went out of existence with this election, and in 1820 there was no opposition to Monroe, the candidate of the Democratic Republicans. Only one electoral vote was cast against him, this by a delegate who declared that no one but Washington should have the unanimous vote of the electoral college. Mexico and the emancipated countries of South America were formally recognized by the American government during Monroe's second term; but the leading event in it was the promulgation of the Monroe Doctrine. (See following article.)

Monroe Doctrine, the term applied to the policy of the United States regarding European interference in the affairs of the American continent. It was formulated in President Monroe's message of December 2, 1823, in the statement that 'the American continents . . . are henceforth not to be considered as subjects for future colonization by any European power.' For full text see under *United States.* Though the doctrine has all the force of a first principle it has never been formally sanctioned by Congress. It has several times been reasserted, notably by Cleveland and Roosevelt; and it was recognized in the Covenant of the League of Nations (q. v.) in 1919.

Monrovia (mon-rō'vi-a), a seaport and the capital of Liberia, West Africa, founded 1824, and named after President Monroe. It ships palm oil, rubber, etc. Pop. (with Krutown) 6000.

Monrovia, a city of Los Angeles Co., California, 20 miles N. E. of Los Angeles, in a fruit-growing region. It is a health resort. Pop. (1920) 5480.

Mons (mons; Flemish, *Bergen*), a city of Belgium, capital of the province of Hainault, 35 miles southwest of Brussels, on the Trouille, here crossed by four bridges. It is situated in the Borinage coal district, with an annual output of 12,000,000 tons. There are manufactures of linen, woolen and cotton fabrics, firearms, cutlery, etc. The principal buildings are the beautiful Gothic church of St. Waltrude, the town hall and the Renaissance belfry. Mons occupies the site of one of Cæsar's forts, and has figured much in history. About three miles to the south is the ridge of Malplaquet, where, at a cost of 20,000 men, the Duke of Marlborough won the last and most terrible of his battles, in 1709.

The British Expeditionary Force defended Mons in the opening weeks of the European war (*q. v.*). On August 23, 1914, five German army corps, with reserves, numbering over 300,000 men, were launched against the small British force of 80,000 men under Sir John French. It was the intention of the Teutons to annihilate England's 'contemptible little army,' as they styled the British Regulars. But though the British were outnumbered four to one, they gallantly held the enemy and retired in good order, inflicting terrible casualties on the Teutons. It was the beginning of the slow, steady retirement of the allied Anglo-French army, which continued till the Marne was reached, and the historic stand was made. See *Marne, Battle of.*

Monsieur (mo-syeu; abbreviated *M.*; plural *Messieurs*, abbreviated *MM.*), used without any addition, formerly in France designated the king's eldest brother, though in addressing him, the title Monseigneur was used. In common use it answers to the English *sir* and *Mr.*

Monsoon (mon'sōn), the name given to a certain modification or disturbance of the regular course of the trade winds which takes place in the Arabian and Indian seas. Between the parallels of 10° and 30° south latitude the eastern trade wind blows regularly, but from the former parallel northwards the course is reversed for half the year, and from April to October the wind blows constantly from the southwest. During the other six months of the year the regular northeast trade wind prevails. These two alternating winds are the monsoons proper, but the name is now frequently given to similar alternating winds in any region.

Monster (mon'ster), or MONSTROSITY, a term applied in anatomy and physiology to living beings which exhibit from birth onwards some important abnormal features in structure, or present notable deviations from the normal type of their kind. The science which investigates such abnormal forms is known as *teratology.* Monsters present very wide variations in the characters and degrees of the malformations, ranging from an almost imperceptible to an almost total deviation from the normal type. But there are definite types of monstrosities, distinguished by distinct anatomical characters, just as there are definite types of normal structure; and the former may be classified by considering the fœtus or embryo. The anatomist may at once detect all fictitious cases of monstrosities by noting that they present characters

perfectly incompatible with any known type of abnormal development. Tales of monsters occurring in man and in beasts are met with in the writings of the older anatomists and naturalists; but such accounts, if not entirely destitute of truth, owe most of their interest to the liberal embellishment with which they have been recorded. Old writers have argued for the production of such ideal monsters by the intercourse of demons and women, of brutes and men; and witchcraft, magic, spell, divine vengeance—and, more lately, the effect upon the mother's mind of fright, terror, dreams, etc.—have each and all been credited, but equally erroneously, with causing malformations and abnormalities in the yet unborn child or embryo. Teratology can explain most, if not all malformations, as results of abnormal growth or disease. These so-called '*freaks* of nature' are in truth the results of morbid actions and operations in the living organism, as well defined, but not yet so well known, as are those of the healthy and normal body. Among the prominent or primary causes in the production of monstrosities in the human embryo are the following:—Deficiencies or deformations in the reproductive organs and conditions of the father or mother, or of both parents; diseases or malpositions of the placenta or afterbirth, or of the fœtal membranes; retardation in the development of the fœtus itself, arising from pressure, injuries, or actual disease either originating from the germ itself or communicated from the mother; and the presence of actual or potential disease in either or both parents. Injuries to the mother may also to some extent affect the embryo, though most authorities are doubtful on the point. Malformations and monstrosities are frequently met with in the lower animals, and particularly in those which are domesticated by man. In the plant world monstrosities also occur.

Monstrance.

Monstrance, or RE-MONSTRANCE (rē-mon'strans), called also *ostensorium* or *expositorium*, is the sacred vessel in which, in the Roman Catholic Church, the host is shown to the people at benedictions, processions, and other solemnities. Its use probably dates from the establishment of the festival of Corpus Christi in 1264 by Pope Urban IV. The earliest monstrances known date from the fourteenth century, and are made in the form of a Gothic tower. The most common form now consists of a chalice-footed stand of some precious metal, and a circular repository, usually a transparent pyx, surrounded by sun-like rays. In the Greek church the monstrance is shaped like a coffin.

Montagnards (mon-tân-yär), or LA MONTAGNE, 'the Mountain,' a popular name in French history, given to the extreme democratic party in the convention, because they occupied the higher rows of benches in the hall where it met. The chiefs of 'the Mountain' were Danton, Marat, and Robespierre, the men who introduced the 'Reign of Terror.' The Mountain rose to the height of its power in June, 1793, and for more than a year it was sufficiently formidable to stifle all opposition. Soon after the fall of Robespierre (July 28, 1794) the name of 'Montagnard' and 'Montagne' gradually disappeared from party nomenclature. A futile attempt was made by the extreme party in the National Assembly, after the revolution of 1848, to revive the title of 'Mountain.'

Montagu (mon'ta-gū), LADY MARY WORTLEY, famous for her brilliant letters, was born in 1689. She was the eldest daughter of Evelyn Pierrepont, afterwards duke of Kingston. In 1712 she made a runaway match with Mr. Edward Wortley Montagu, a wealthy Whig scholar, who had quarreled with her father. On the accession of George I in 1714 Mr. Montagu obtained an official position in London, and Lady Mary emerged from the rural seclusion in which she had hitherto spent her life. Her beauty and elegance and her wit and vivacity rapidly gained her admiration and influence, and she became familiarly acquainted with Addison, Congreve, Pope, and other distinguished writers. In 1716 Mr. Montagu was appointed ambassador to the Porte, and Lady Mary accompanied him to Constantinople, where they remained from January, 1717, to May, 1718. It was during this period that Lady Mary's famous *Turkish Letters* were written. On her return to England she resumed her ascendency in the gay world of wit and fashion. She had, however, the misfortune to quarrel with Pope, and a long and keen literary war ensued, which did honor to neither. In 1739 Lady Mary left England to spend the remainder of her days on the Continent, but returned and died in 1762. Her

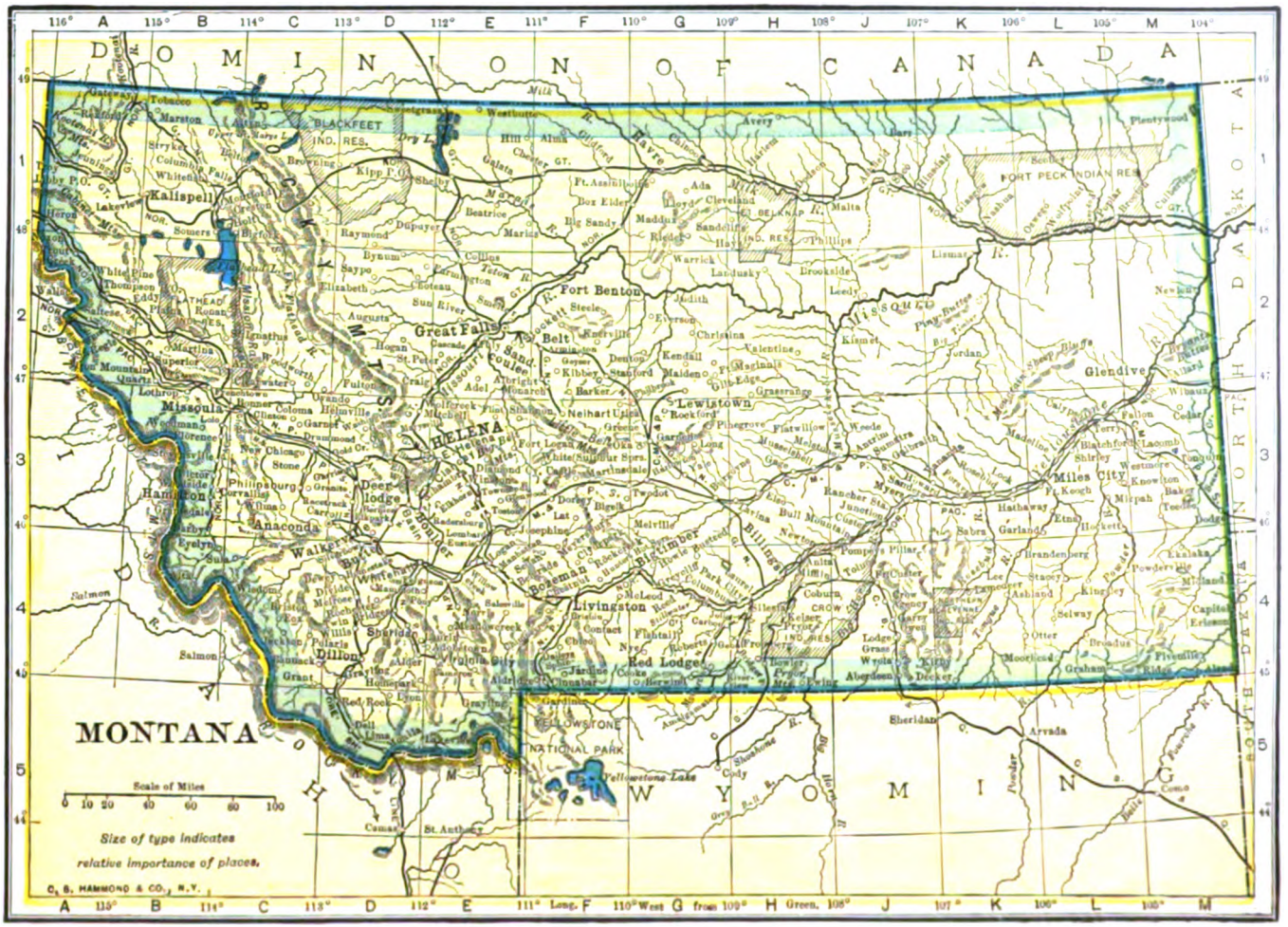
letters are marked by great vivacity and graphic power, together with keen observation and independent judgment. Lady Mary has another claim to remembrance in her courageous adoption of the Turkish practice of inoculation for smallpox, and for her energy in promoting its introduction into England.

Montague (mon-tăg'), a town (township) of Franklin Co., Massachusetts, bounded on the west by the Connecticut River and 52 miles W. of Fitchburg. It has extensive manufactures. Pop. (1920) 7675.

Montaigne (mon-tān'; Fr. pron. mon-ten-y'), MICHEL EYQUEM DE, the famous French essayist, was born in 1533 at the castle of Montaigne, in Périgord. He learned Latin conversationally before he could speak French, and Greek was also an early acquisition. At the age of six he became a pupil at the Collége de Guienne at Bordeaux, and at thirteen he began to study law. Little is known of his youth and early manhood. He was a parliamentary counselor from 1554 till 1567; he seems to have seen some military service in 1556; he married the daughter of a fellow counselor; and at some period was appointed a gentleman of the chamber to the king. In 1571, however, he retired to his ancestral château, and devoted himself to peaceful study and meditation. In 1580 he published the first two books of his *Essais*, and immediately afterwards set out on a journey through Germany, Switzerland, and Italy to restore his health, which had been shattered by the attacks of a hereditary disease. In 1582 and 1584 he was chosen mayor of Bordeaux. In 1588 he republished his *Essais*, with the addition of a third book. After a last visit to Paris (in the course of which he was thrown into the Bastile for a short time by the Leaguers) Montaigne seems to have dwelt quietly in his château. He died of quinsy in 1592. Montaigne's *Essais* have at all times been one of the most popular books in the French language. They embrace an extraordinary variety of topics, which are touched upon in a lively and entertaining manner, with all the raciness of strong native good sense, careless of system or regularity. Sentences and anecdotes from the ancients are interspersed, with his own remarks and opinions, and with stories of himself in a pleasant strain of egotism, and with an occasional license, to which severer moralists can with some difficulty reconcile themselves. His *Voyages*, a diary of his journeys in 1580-82, the MS. of which was discovered 180 years after his death, were published in 1774. There are two English translations of the *Essais*, one by Charles Cotton, and an earlier one by John Florio.

Montalambert (mon-tă-lăn-bār), CHARLES FORBES RENÉ, COMTE DE (1810-70), a French publicist, politician, historian and theologian, born in London in 1810; died at Paris in 1870. His father was a French emigré, afterwards a peer in France under the Restoration; his mother was English. Till 1819 Montalambert's education was carried on in England; but it was concluded in Paris. At the age of twenty he enthusiastically supported Lamennais and Lacordaire in their movement to promote liberty within the church; but when *L'Avenir*, the organ of the movement, was condemned by an encyclical letter from the pope in August, 1832, he turned his attention elsewhere. In 1835 he took his seat in the chamber of peers, and his eloquence, sincerity, and ability soon made him one of the most influential orators in the chamber. After the revolution of 1848 he was elected a member of the National Assembly. He was at first inclined to support Napoleon III, but was soon alienated by the policy of that emperor. Failing to be elected in 1857, he spent the remainder of his life in writing and traveling. Montalambert was an ardent lover of liberty, and yet a firm believer in aristocracy and ultramontanism. He had a profound admiration for the social and political institutions of England. Of his very numerous writings the chief is his *Monks of the West* (English transl. 1861-68). Others are *Vie de Ste. Elisabeth de Hongrie* (1836) and *L'Avenir Politique d'Angleterre* (1885).

Montana (mon-tă'na), one of the Western United States, organized as a territory in 1864 out of portions of the territories of Idaho and Dakota, admitted as a State in 1889. It is bounded on the north by Canada, east by the Dakotas, south by Wyoming and Idaho, and west by Idaho, and its area is 146,572 sq. miles. The surface is generally mountainous, the great range of the Rocky Mountains extending across the State, while minor chains occur in different parts. The principal rivers are the Missouri, the Yellowstone, and Clark's Fork of the Columbia. While largely mountainous, the State has broad areas of farming and grazing land, it being estimated that its farming area is equal in extent to the State of Iowa, its mountain and grazing area to Indiana, and its forest and Indian reserves to Georgia. While the rainfall is very scanty, the mountain valleys in the west


DOMINION OF CANADA
MONTANA
Scale of Miles
0 10 20 40 60 80 100
Size of type indicates relative importance of places.
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Kalispell
Missoula
Great Falls
Fort Benton
HELENA
Lewistown
Glendive
Miles City
Deer Lodge
Anaconda
Hamilton
Dillon
Livingston
Bozeman
Red Lodge
Billings
Sheridan
Arvada
Fort Peck Indian Res.
Blackfeet Ind. Res.
Fort Belknap Ind. Res.
Crow Ind. Res.
Yellowstone National Park
Yellowstone Lake
Flathead L.
Missoula L.
Clark Fork
Missouri R.
Yellowstone R.
Milk R.
Powder R.
Tongue R.
Bighorn R.
Bighorn L.
Judith
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Kibbey
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Choteau
Dupuyer
Cut Bank
Shelby
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Wolf Point
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Scobey
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Culbertson
Sidney
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Hardin
Crow Agency
Lodge Grass
Wyola
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Big Timber
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Virginia City
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Darby
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Stevensville
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Superior
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Libby
Troy
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Whitefish
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Flathead L.
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St. Ignatius
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Trout Creek
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Kootenai R.
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Madison R.
Jefferson R.
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Bitterroot R.
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Flathead R.
Swan R.
Blackfoot R.
Rocky Mts.
Big Belt Mts.
Little Belt Mts.
Bridger Mts.
Crazy Mts.
Pryor Mts.
Wolf Mts.
Big Snowy Mts.
Judith Mts.
Highwood Mts.
Sweetgrass Hills
Bear Paw Mts.
Little Rocky Mts.
Cypress Hills
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Yellowstone R.
Powder R.
Tongue R.
Bighorn R.
Bighorn L.

are exceedingly fertile, and irrigation, both private and governmental, is steadily bringing a wider area under cultivation. The leading agricultural products are wheat and oats, and fruit has become a very promising industry. The products of the farms promise soon to exceed those of the mines in value. Grazing, lumbering, sheep farming and wool production are industries of vast importance. Cattle and horses are also largely kept. The mineral wealth is very great, and the original settlement of the State was due to the discovery of gold and silver in abundance. Copper, lead and sapphires are also found, and large deposits of bituminous and lignite coal have been discovered. It ranks second among the States in the production of copper and silver. Among the wild animals are the black and grizzly bear, coyote, lynx, mountain lion, moose, elk, deer, mountain sheep and goat. The pine, fir, hemlock and cedar abound. Forest area, about 16,000,000 acres. Glacier National Park is in the northwestern section. Among its educational institutions are the University of Montana (founded 1895; 1100 students), at Missoula; College of Agriculture and Mechanic Arts, at Bozeman; State School of Mines, at Butte. The capital is Helena; largest city, Butte. It was admitted to the Union in 1889. Pop. (1900) 243,329; (1910) 376,053; (1920) 548,889.

Montanus (mon-tā'nus), the founder of a Christian sect, appeared about the middle of the second century in Phrygia, as a new Christian prophet, advocating an ascetic code of morals and behavior, fasting, celibacy, and willing submission to martyrdom. He sought to establish a community of all true believers at Pepuza in Phrygia, there to await the second Advent. The Montanists were forced to withdraw from the Catholic Church and form themselves into a separate sect in Phrygia about 180. In North Africa they flourished for some time, but by the fourth century they seem everywhere to have disappeared or been merged with other sects.

Montargis (moṇ-tär-zhē), a town of France, department of Loiret, on the Loing, 39 miles E. N. E. of Orleans. It has the remains of a fine castle, a favorite royal residence before Fontainebleau. Montargis has manufactures of paper, etc. Pop. 11,038.

Montauban (moṇ-tō-bäṇ), chief town of the department of Tarn-et-Garonne, in France, is finely situated on the Tarn, 120 miles S. E. of Bordeaux. Active manufactures of silk, wool, etc., are carried on. Montauban was a stronghold of the Huguenots, and the Protestants still maintain an academy and a theological college. Pop. 16,813.

Montbéliard (moṇ-bā-ä-lyär; Ger. *Mömpelgard*), a walled town of France, in the department of Doubs, 40 miles northeast of Besançon. It is a busy industrial town, with manufactures of clocks and watches, hardware and textile fabrics. Pop. 8723.

Mont Blanc (moṇ-blaṇ; that is 'White Mountain'), the loftiest mountain of Europe, belonging to the Pennine chain of the Alps, and rising 15,781 feet above the sea-level, is situated on the frontiers of France and Italy, and near that of Switzerland. The main portion of the mountain and the highest summit are in France (Haute Savoie). The huge mountain mass (30 miles long by 10 miles wide) is almost entirely granitic. It has numerous summits, some rounded, some sharp (aiguilles). On the S. E. its face is steep; on the N. W. lateral chains are sent off, among which about thirty glaciers are counted. The chief are the glaciers Des Bossons, Bois, Argentière and Mer de Glace. The summit was first reached in June, 1786, by the guide Jacques Balmat.

Montbrison (moṇ-brē-sōṇ), a town of France, department Loire, on the Vizezy. Pop. 6564.

Montcalm (moṇ-käm), LOUIS JOSEPH SAINT VERAN, MARQUIS DE, a French general, born in 1712. Having entered the army he distinguished himself in several campaigns in Europe, and in 1756 was appointed to the chief command of the French troops in Canada, during the French and Indian war. Here he took Fort Ontario (Oswego) and Fort William Henry (on Lake George), and occupied Ticonderoga (1758); but at Quebec, in 1759, was completely defeated by General Wolfe on the Heights of Abraham, both commanders being mortally wounded.

Montclair (mont-klär'), a city of Essex County, New Jersey, 5 miles N. N. W. of Newark. It is situated at the base and on the slopes of Orange Mountain, and is a place of residence for many New York and Newark business men. Pop. (1910) 21,550; (1920) 28,810.

Mont de Marsan (moṇ dē mär-säṇ), a town of France, capital of the department of Landes, at the junction of the Douze and Midou. Pop. 9059.

Mont-de-Piété (moṇ-dē-pē-ā-tā; in Italian *Monte di Pietà*), a name for banks of charity which lend money on pledges at a low rate of interest, and whose aim is purely philanthropic. These institutions were estab-

lished to prevent the scandal and abuse of usury, and exist in Italy, France, the Netherlands, Spain, etc. In Britain pawnbrokers take the place of monts-de-piété.

Mont Dore (mon dōr), a village with mineral springs and baths in Central France, dep. Puy de Dôme, situated among the mountains known as Monts Dore, highest summit Puy de Sancy (6100 ft.). Pop. 1677.

Montebello (mon-tā-bel'lō), a village in North Italy, 25 miles E. N. E. from Alessandria, noted for two Austrian defeats. On June 9, 1800, the victors were the French under Lannes, afterwards Duke of Montebello; and on May 20, 1859, the allied troops of France and Sardinia under Gen. Forey.

Monte Carlo (mon'tē kär'lō). See *Monaco*.

Monte Casino (mon'tā kâs-sē'-nō), a famous Italian Benedictine monastery near San Germano, on the route between Rome and Naples. It was founded in 529 by St. Benedict on the site of an ancient temple of Apollo, to which Dante alludes, and which commands a magnificent prospect. It became renowned for its privileges and wealth, and its library grew rich in MSS. As a monastery it was dissolved in 1866, but it continues to exist in the form of an educational establishment. The church is magnificent, and contains the remains of St. Benedict.

Monte Cristo (mon'tā krēs'tō), a small island 6 miles in circumference belonging to Italy, 25 miles S. of Elba, the seat of a penal colony. Dumas has given the name of this isle to the hero of one of his most popular romances.

Montecuculi (mon-tā-kö'ko-lē), or more correctly, MONTECU'COLI, RAIMONDO, Prince of the Empire, and Duke of Melfi, military commander, born near Modena, Italy, in 1608; died at Linz in 1680. He entered the Austrian service, and served during the Thirty Years' war with great distinction. After the Peace of Westphalia (1648) he visited Sweden and England in a diplomatic capacity; and in 1657 the emperor sent him to the aid of the King of Poland against Rakoczy and the Swedes, and next year he assisted the Danes against the latter. In 1664 he gained a great victory over the Turks, after having driven them out of Transylvania. In 1673 he was placed at the head of the imperial troops, and checked the progress of Louis XIV by the capture of Bonn, and by forming a junction with the Prince of Orange in spite of Turenne and Condé. Montecuculi's subsequent advance into Alsace was repulsed by the Prince of Condé. His last military exploit was the siege of Philipsburg.

Montefiore (mon-te-fi-ō'rā), SIR MOSES, a Jewish philanthropist and centenarian, was born in England in 1784; died in 1885. In 1837 he was chosen sheriff of London, the same year he was knighted, and in 1846 he was made a baronet. His benevolence to Jews throughout the world was unbounded; and he visited Palestine seven times, the last when in his 92d year.

Montego Bay (mon-tē'gō), a seaport, situated on a bay of the same name on the N. W. coast of Jamaica. The bay is an open roadstead, and is exposed to storms from the north. Pop. about 6000.

Montelimar (mon-tā-li-mär), a town of France, dep. of Drôme, at the junction of the Roubion and Jabron, formerly a stronghold of the Huguenots. Its old castle is now used as a prison. It has manufactures of silk, hats, leather, etc. Pop. 9162.

Montemayor (mon-tā-mā'yōr), JORGE DE, a Spanish poet, born about 1520; died in 1561. In his youth he was a soldier, but he afterwards entered the service of Philip II as a singer, and accompanied that prince abroad. After his return he lived in Leon, where he wrote his celebrated *Diana Enamorada* (1542), the earliest Spanish pastoral romance.

Montenegro (mon-tā-nā'grō; native *Tzrnagora*, Turkish *Karadagh*, all meaning Black Mountain), an independent kingdom of Europe, in the northwest of Turkey, bounded by Austria, Albania, the Adriatic and Servia. Area, about 5650 sq. miles. The surface is everywhere mountainous, being covered by an extension of the Dinaric Alps, rising to the height of 8850 ft. There are, however, a few beautiful and verdant plains and valleys, in which the soil is tolerably fertile. The principal river is the Moratcha. About half of the Lake of Scutari, besides several smaller lakes, lies within the Montenegrin boundary. The climate is healthy. Forests of beech, pine, chestnuts, and other valuable timber cover many of the mountain sides. Fruit trees of all kinds abound, especially in the sheltered valleys, where even almonds, vines, and pomegranates ripen. Agriculture is in a very rude and inefficient state, though every cultivable piece of land is planted with Indian corn, potatoes, tobacco, rye, wheat, cabbages, or some other useful plant. Sheep, cattle and goats are reared in great numbers.

Manufactures, with exception of a coarse woolen stuff, are unknown. The chief occupations of the Montenegrins are agriculture and fishing, trade being altogether left to foreigners. The exports are sheep and cattle, provisions, sumach, honey, hides, cheese, butter, and other agricultural produce. The chief towns (in reality little more than villages) are Cettinje (4500 inhabitants), the capital; Podgoritza (4000 inhabitants); Niksich, and the seaports Dulcigno and Antivari. The Montenegrins are pure Serbs and speak a Serbian dialect. They are generally of tall stature and well proportioned. The men go at all times fully armed, whatever be the occupation in which they are engaged, and all between 14 and 50 years of age (estimated at 29,000) are liable to military service. In religion they are of the Greek church.

The history of Montenegro is a record of deadly struggles with the Turks. Practical independence was established in 1700. From 1788 to 1878 the Montenegrins co-operated in all the Russo-Turkish wars, and in 1910 Montenegro was made a kingdom. In the first Balkan war (*q. v.*) it joined the other Balkan states opposing Turkey and captured Scutari, but later was compelled by the council of the Powers to surrender it to the new principality of Albania. As a result of the second Balkan war the mountain kingdom received from Servia half of the Sanjak of Novi Bazar and nearly doubled her population. On August 7, 1914, Montenegro declared war on Austria. (See *European War*) and in conjunction with a Servian army invaded Herzegovina, capturing the capital. At the end of 1915 the Austrians began a great offensive, drove the Montenegrins back and occupied the capital, Cettinje, January 13, 1916, and were in complete possession of the country by the end of the month. The population in 1910 was about 260,000; in 1917, 436,789, including territory gained as a result of the Balkan wars (q. v.). King Nicholas was deposed in 1918, and Montenegro was joined with Jugo-Slavia.

Montereau (mon-tē-rō), a town of France, department of Seine-et-Marne, at the confluence of the Yonne and the Seine. Pop. 9000.

Monterey (mon-te-rā'), a city in Monterey Co., California, on Monterey Bay, 90 miles S. E. of San Francisco. It has a good harbor and is a favorite seaside resort. There are many examples of Spanish Mission architecture. Pop. (1920) 5479.

Monterey (mon-te-rā'), capital of the State of New Leon, in Mexico, about 100 miles from the Texas frontier. Monterey, which is said to be the most Americanized town in Mexico, has a considerable transient trade, and nearby are lead, copper and silver mines. In 1846 it was captured by the United States troops under General Taylor. Pop. 62,226.

Monte Rosa. See *Rosa.*

Monte-Sant-Angelo (mon'tā sänt ä n'jä-lō), a town of S. Italy, 28 miles northeast of Foggia, has a picturesque castle and numerous churches. Pop. 17,369.

Monte Santo. See *Athos.*

Montespan (mo ŋ-tes-päŋ), FRANÇOISE ATHENAIS, MARCHIONESS DE, mistress of Louis XIV, born in 1641, was the second daughter of the Duke of Mortemart, and was, in 1663, married to the Marquis de Montespan. To the most fascinating beauty she added a natural liveliness and wit, and a highly cultivated mind. Soon after her appearance at court she attracted the king's attention, and from 1668 till 1674 she shared his favor with Mlle. de la Vallière. The latter, however, withdrew in 1674; M. de Montespan had already been ordered to retire to his estate. Mme. de Montespan bore eight children to the king, four of whom died in infancy. The others were intrusted to the care of Mme. Scarron, afterwards de Maintenon. The influence of the favorite mistress was often exercised in public affairs, and her empire over the king continued until about 1679, when a growing attachment to Mme. de Maintenon finally estranged his affections from Mme. de Montespan. She rarely appeared at court after 1685, and in 1691 she entirely quitted it. Her last years were devoted to religious exercises, acts of benevolence, and penitence.

Montesquieu (mo ŋ-tes-ky*eu*), CHARLES LOUIS DE SECONDAT, BARON DE LA BRÈDE ET DE, born in 1689 at the château of La Brède, near Bordeaux; died at Paris in 1755. He studied law; in 1714 became a counselor of the parliament of Bordeaux; and in 1716, on the death of his uncle, parliamentary president and Baron de Montesquieu. The *Lettres Persanes*, the first of the three great works on which his fame principally rests, appeared in 1721. Purporting to consist of the correspondence of two Persians traveling in France, this book is a lively satire upon the manners and customs, and the political and ecclesiastical institutions of the author's age and country. Other works of less importance followed; and in 1728

Montesquieu was admitted to the French Academy. He gave up his president's office in 1726, and then visited Germany, Hungary, Italy, Holland and England. In England he stayed for eighteen months, and imbibed a deep admiration for its social and political institutions. He returned to France in 1731, and in 1734 he published his *Considérations sur les Causes de la Grandeur et la Décadence des Romains.* In 1748 *L'Esprit des Lois* the result of twenty years of labor, was published, and at once placed its author among the greatest writers of his country. The scope of the work is perhaps best indicated by the subtitle of the original edition, which describes it as a treatise on the relation which ought to exist between the laws and the constitution, manners, climate, religion, commerce, etc., of each country. Among his lesser works are *Dialogue de Sylla et d'Eucrate; Le Voyage de Paphos; Essai sur le Goût* (unfinished); *Arsace et Isménie; Lettres Familières,* etc.

Montessori Method (mon'tes-sor'i), a system of education devised and carried into effect by Maria Montessori, an Italian physician and educator, who in 1907 opened the first 'House of Childhood' (*Casa dei Bambini*) in Rome and began to apply her revolutionary methods of education to the teaching of little children. In June, 1911, Switzerland passed a law establishing the Montessori system in all its schools. Model schools were soon opened in Paris, New York and Boston. Madame Montessori opened a training school in Rome. Madame Montessori endeavors to give the child an environment that will liberate his personality, and tries, through sense education, to stimulate the intellect itself. The children in her class room are not supplied with desks, but with comfortable chairs which they can move about at will. Frequently they squat on the floor or stand while playing with the apparatus by which they learn. There is practically no formal instruction, but the children learn to read and and write with surprising rapidity.

Montevideo (mon-tē-vid'ē-ō), capital of Uruguay, is situated on a small peninsula on the north coast of the estuary of the La Plata, 130 miles east-southeast of Buenos Ayres. Montevideo is one of the best built towns in South America, and enjoys one of the finest climates. The principal buildings comprise the cathedral, the town house, the Solis opera house, the custom-house, exchange, etc. There is a university with 60 professors and nearly 700 students. The commercial development of Montevideo, considerable as it is, has been much retarded by the shallowness of its harbor. Extensive dry docks have been recently constructed. Over 60 per cent. of the tonnage entering and clearing at Montevideo is British. The chief exports are wool, hides, tallow, dried beef, and extracts of flesh. The chief imports are British cottons, woolens, hardware, and other manufactured articles. Montevideo sends out above half the whole exports of Uruguay, and receives all but a small fraction of the imports. Pop. 312,946, one-third of whom are foreigners.

Montezuma (mon-te-zö'ma), Aztec emperor of Mexico when Cortez invaded the country in 1519. Influenced by an ancient prophecy, he at first welcomed the Spaniards; but when he discovered that they were no supernatural beings he secretly took measures for their destruction. Cortez on learning this seized Montezuma, and compelled him to recognize the supremacy of Spain. The Aztecs immediately rose in revolt, and refused to be quieted by the appearance of Montezuma. While urging them to submission he was struck on the temple with a stone and fell to the ground. Cut to the heart by his humiliation, he refused all nourishment, tore off his bandages, and soon after expired.

Montfort (mont'fort), SIMON DE, Earl of Liecester, famous in the constitutional history of England, was born in France between 1195 and 1200. He was the youngest son of Simon de Montfort, Earl of Leicester, the 'scourge of the Albigenses.' He won the favor of Henry III, and married Eleanor, countess dowager of Pembroke, and sister of the king. From 1248 till 1252 he acted as the king's 'locum tenens' in Gascony; but complaints of his despotic rule led to a trial before the lords, which resulted in his acquittal and a violent quarrel with Henry. He was conspicuous among those who extorted the Provisions of Oxford from the king in the 'Mad Parliament' in 1258; and he was the leader of the barons in the so-called 'Barons' war' that followed. The Mise of Lewes, to which Henry III agreed, contained the outlines of a new constitution, in which the principle of representative government was recognized; but this principle was carried a step farther in the famous parliament of De Montfort, which was summoned to meet at Westminster on January 20, 1265. The king accepted the constitution on February 14, 1265; but Prince Edward and the Mortimers raised the standard of revolt. At the battle of Evesham (August

4. 1265) De Montford was defeated and slain. His memory was long revered by the people as a martyr for the popular liberty. See also *England* (*History*) and *Henry III.*

Montgolfier (mont-gol'fe-èr), JOSEPH MICHEL (1740-1810) and JACQUES ETIENNE (1745-1799), joint-inventors of the balloon, were born at Vida-lon-lès-Annonay, in the department of Ardéche, in France. Their first balloon, inflated with rarefied atmospheric air, ascended from Annonay in 1782, and the invention soon brought them fame and honors. Joseph was also the inventor of the water-ram. See *Aeronautics.*

Montgomery (mont-gum'e-ri), or MONTGOMERYSHIRE, an inland county in North Wales, has an area of 797 sq. miles, consisting mostly of wild, rugged, and sterile mountains, varying from 1000 to 2000 feet in height. It contains, however, some fine and fertile valleys, the most extensive and fruitful of which is that of the Severn, the principal river. The county is almost entirely occupied by the slate-rocks which overspread so large a portion of Wales. Lead and zinc are procured, and also some copper. The cultivation of the soil is carried on chiefly in the narrow valleys, and on the east side of the county, bordering on Salop. Wheat and oats are the principal crops; and orchards and gardens are numerous on the east side of the county. In the hilly districts cattle and great numbers of small and hardy ponies, commonly called *merlins*, are reared. Flannels are manufactured, as are also a kind of cottons called 'Welsh plains.' Montgomery is the county town, but the largest town is Welshpool. Pop. 53,146.

Montgomery, the capital of Alabama, county seat of Montgomery Co., on the Alabama River, at the head of navigation, 180 miles by rail N. E. of Mobile on the Seaboard Air Line, Louisville & Nashville, and other railroads. The principal buildings are the Capitol, in the rotunda of which the Confederate government was organized, 1861; the U. S. court house, and city hall. It is the home of the Woman's College of Alabama and a normal school for colored students. The city is an important jobbing and commercial center; has the largest cotton and fertilizer markets in the South; the largest livestock yard in the South; and the second largest syrup refineries in the South; besides a great number of plants connected with the cotton industry. Pop. (1910) 38,136; (1920) 43,464.

Montgomery, ALEXANDER, a Scottish poet who flourished during the latter half of the sixteenth century, was born at Hazelhead Castle in Ayrshire. He seems to have experienced the fluctuating fortune of a courtier, at first in the service of the regent Morton, and afterwards in that of James VI, who granted him a pension. He died probably between 1605 and 1610. His principal poem, the allegory of the *Cherry and the Slave*, was first published in 1597. Many of his sonnets and miscellaneous pieces, some of which have considerable merit, were written much earlier and circulated in manuscript.

Montgomery, JAMES, the 'Christian Poet,' was born in 1771 at Irvine, Ayrshire, where his father was a Moravian preacher; died at Sheffield in 1854. He was educated at the Moravian school of Fulneck, near Leeds, and in 1792 became editor of the *Sheffield Iris*, a liberal dissenting paper, a post which he held till 1825. He was twice imprisoned (1795-96) for political offenses in his newspaper; and in 1797 he published his first volume of poems, under the name of *Prison Amusements*. In 1806 appeared his *Wanderer in Switzerland*, the first effort of his which gained the approbation of the public, though severely handled by the *Edinburgh Review*. It was followed in 1809 by the *West Indies;* in 1813 by *The World Before the Flood;* in 1819 by *Greenland*, a missionary poem; and in 1827 by *The Pelican Island*, perhaps his best work. He also wrote a number of hymns and other small pieces, which were published along with his longer poems.

Montgomery, RICHARD, soldier, was born in Swords, Ireland, in 1736. After serving with credit in the English army he was with Wolfe in 1759 at the taking of Quebec, and soon after resigned his commission and emigrated to America, where, in 1775, he was a delegate to the Continental Congress. Put in command of the northern department, he invaded Canada, captured Montreal, and was killed December 31, 1775, in a gallant attack on Quebec.

Montgomery, ROBERT (1807-55), a prolific versifier, is chiefly famous for having been mercilessly ridiculed by Lord Macaulay in the *Edinburgh Review*. He was born at Bath in 1807, and having taken orders in the Church of England, officiated at Percy Street chapel in London till his death in 1855, with an interval of four years as pastor of St. Jude's Episcopal chapel in Glasgow. His chief works, which amply justify Macaulay's strictures, though hardly their tone, are *The Omnipresence of the Deity* (1828); *Satan* (1830), whence his sobriquet of 'Satan Montgomery'; and *The Messiah.*

Month, a period of time derived from the motion of the moon; generally one of the 12 parts of the calendar year. The calendar months have from 28 to 31 days each, February having 28, April, June, September and November, 30, the rest 31. Month originally meant the time of one revolution of the moon, but as that may be determined in reference to several celestial objects there are several lunar periods known by distinctive names. Thus the *anomalistic month* is a revolution of the moon from perigee to perigee, average 27 days 13 hrs, 18 min. 37.4 sec.; the *sidereal month*, the interval between two successive conjunctions of the moon with the same fixed star, average 27 days 7 hrs. 43 min. 11.5 sec.; the *synodical*, or *proper lunar month*, the time that elapses between new moon and new moon, average 29 days 12 hrs. 44 min. 2.9 sec. The *solar month* is the twelfth part of one solar year, or 30 days 10 hrs. 29 min. 5 sec.

Monti (mon'tē), VINCENZO, an Italian poet, born in 1754; died in 1827. Educated at Faenza and Ferrara, in 1778 he went to Rome, where he wrote two tragedies—*Aristodemo* and *Galeotto Manfredi*—the splendid style of which was admired, although the plots were thought too tragic, and dramatic action was wanting. The murder of the French ambassador Basseville at Rome in 1793, gave occasion to his fiercely anti-republican poem *Bassvilliana*, in which he closely imitates Dante. Subsequently Napoleon appointed him secretary of the directory of the Cisalpine Republic in Milan, and finally historiographer of the kingdom of Italy. In this last-named capacity the poet published in Napoleon's honor his *Bardo della Selva Nera*, which, however, was received with disapprobation. Monti also published a third drama, *Caio Gracco*, and translated Homer's *Iliad*. He died in 1827 at Milan.

Monticello (mon-tē-sel'lō), the former residence of Thomas Jefferson, in Albemarle County, Virginia, on an elevation near Charlottesville. The great statesman is buried in a small private graveyard adjoining the road leading to the house.

Montilla (mon-tēl'yȧ), a town in Spain, province of Cordova; produces a fine variety of sherry, dry and rather bitter, variously known as Montilla and Amontillado. Pop. 13,603.

Montluçon (moṇ-lü-sōṇ), a town in France, department of Allier, on the Cher, 40 miles S. W. of Moulins, was a strong fortress during the middle ages. Portions of the walls and towers still remain. The castle, on a height above the river, dates from the fifteenth and sixteenth centuries. The manufactures are plate-glass, iron, cutlery, etc. Pop. 31,888.

Montmorency (mont-mō-ren'si), is a small river of Canada, which rises in Snow Lake, province of Quebec, flows south, and joins the St. Lawrence 8 miles below Quebec. Near its mouth are the Falls of Montmorency, which have a breadth of about 50 feet, and a perpendicular descent of 242 feet.

Montmorency (moṇ-mo-rāṇ-si), the name of a noble family of France and the Netherlands, derived from the village of Montmorency, near Paris. One of its most distinguished members was ANNE DE MONTMORENCY, first duke of Montmorency, Constable of France, and a distinguished general, born in 1492. He distinguished himself at the battle of Marignano in 1515, and for his valor at Bicocca, in 1522, was made marshal. He was taken prisoner along with Francis I at the battle of Pavia, in 1525, but was soon after ransomed. In 1536 he defeated Charles V Francis I conferred on him the dignity of Constable in 1538. In 1551 he was made a duke. In 1557 he lost the battle of St. Quentin against Philip II of Spain, and was taken prisoner, but he regained his freedom by the Peace of Cateau-Cambrésis in 1559. Under Charles IX he joined the Duke of Guise and Marshal St. André in forming the famous triumvirate against Condé and the Huguenots. At the battle of Dreux, in 1562, Montmorency was made prisoner by the Huguenots; on the renewal of the civil war he gained a decisive victory over them at St. Denis, November 10, 1567, though the following day he died of his wounds. His grandson, DUKE HENRY II, born in 1595, was in his eighteenth year created Admiral of France. He fought successfully against the Huguenots and Spaniards, and was made a marshal; but having joined Gaston, duke of Orleans, in rebellion against the influence of Richelieu, he was taken prisoner at the battle of Castelnaudary, and executed at Toulouse as a traitor in 1632.

Montoro (mon-tō'ro), a town of Spain in Andalusia, 27 miles northeast of Cordova, is situated on the Guadalquivir, which is here crossed by a handsome bridge of the sixteenth century. Pop. 14,581.

Montpellier (moṇ-pel-yā), chief town of the department of Hérault, in France, is situated in a picturesque region, on the Lez, about 6 miles north of the Mediterranean and 80 miles W. N. W. of Marseilles. It is one of the

handsomest towns of the south of France. Among its noteworthy features are the Peyrou, a splendid promenade, on which is the so-called Château d'Eau, at the termination of a noble aqueduct; the citadel; the cathedral; the Palais-de-Justice; and the Porte de Peyrou, a triumphal arch of the Doric order. Montpellier is well equipped with educational and other institutions, and since the twelfth century has been famous for its school of medicine, said to have been founded by Arab physicians driven out of Spain. There are also 'faculties' of law, science, and literature, and a public library of 100,000 vols. The botanical garden, begun under Henry IV, is the oldest in France. Montpellier manufactures cottons, candles, soap, verdigris, chemicals, etc. Pop. (1910) 80,230

Montpelier (mont-pēl'yer), capital of Vermont, county seat of Washington Co., on Winooski River, 35 miles S. E. of Burlington. Its fine Capitol has a dome 124 feet high. Has granite, saw-mill machinery and other works. Pop. (1920) 7125.

Montreal (mont-rē-ăl'), the largest city and the commercial capital of the Dominion of Canada, is situated on an island of the same name, formed by the mouths of the Ottawa, where, after a course of 750 miles, it debouches into the St. Lawrence. It is built upon the left or northern bank of the St. Lawrence, and is situated 180 miles S. W. of Quebec and 985 miles by river from the Atlantic Ocean. Behind the town rises the Mount Royal (Mont Real), from which it derives its name, and which is reserved as a public park. Situated at the junction of the inland and the ocean navigation, it has a harbor with three miles of wharfage accessible to steamers of the deepest draught. The canals, which have their outlet at this point, afford, with the waters they connect, uninterrupted navigation from the Strait of Belle Isle to Port Arthur, at the head of Lake Superior, a distance of 2260 miles. There are numerous lines of steamships which have their Canadian headquarters at Montreal. It is also the chief terminus of the Grand Trunk Railway, and the eastern terminus of the Canadian Pacific Railway. The city, which is one of the most attractive in Canada, contains many handsome public buildings; and is divided into distinctly marked English and French quarters. The chief public buildings are the court-house, the barracks, Bonsecours Market, custom-house, city hall, etc.; and the principal churches are St. Peter's Cathedral, constructed on the model of St. Peter's at Rome; the church of the Notre Dame (large enough to accommodate 10,000 persons); St. Patrick's, Christ Church Cathedral, St. Andrew's, St. Paul's, etc. McGill University, Presbyterian College, Wesleyan Theological College, Congregational College, Anglican Diocesan College, Bishop's College and University, Montreal School of Medicine and Surgery, Royal Victoria College (for women), are the leading Protestant educational institutions; those of the Roman Catholics comprise Laval University, St. Mary's College, Montreal College, Hochelaga Convent, etc. There are also a Society of Natural History, a museum and library, Mechanics Institute, Canadian Institute, Fraser Institute, etc. There are several libraries besides those of the above institutions, a natural history society with museum, an art association, musical societies, etc. The exports are chiefly the products of the country, such as grain, flour, cheese, lumber, etc., and there is a large trade in furs. The principal imports are cottons, woolens and silks, iron and hardware, and tea and sugar. Among the industrial establishments of Montreal are iron foundries, distilleries, breweries, sugar refineries, soap and candle works; and there are manufactures of cotton, silk,

boots and shoes, paper, carpets, tobacco, hardware, edge-tools, floor-cloth, carriages, etc. The Grand Trunk Railway, which connects the railways of Canada with those of the United States, crosses the St. Lawrence at Montreal by the stupendous (tubular) Victoria Bridge, 9184 feet in length, constructed in 1854-59. Montreal was founded, under the name of Villemarie, in 1642, on the site of the Algonquin village Hochelaga. It came into the hands of the English in 1760, when it was taken from the French by General Amherst. It was the seat of government of Lower Canada until 1849, in which year it was superseded by Quebec. The population in 1881 was 140,747, but since then several important municipalities have been annexed to the city, and the population had grown by 1917 to 640,000, or including outskirts 733,000, the majority of whom are of French origin.

Montreal, an island of Canada, in the river St. Lawrence, at the confluence of Ottawa River, 32 miles long, and 10½ broad, containing the city of Montreal. The surface is generally level (with the exception of Mount Royal), and the soil is for the most part fertile and well cultivated.

Montrose (mon-trōz'), a seaport town in Forfarshire, Scotland, is situated 60 miles N. E. of Edinburgh, at the mouth of the South Esk, which widens out into a shallow expanse behind the town, known as Montrose Basin. The river is crossed by a suspension bridge, and by a railway bridge. Between the town and the sea are extensive 'links.' Montrose is a well-built and fairly prosperous provincial town, with the usual public buildings and institutions, including two public libraries and one of the largest parish churches in Scotland. The principal employment is flax spinning, employing about 2000 hands. Shipbuilding is also carried on, and there are extensive saw-mills. The foreign trade, which is largely in timber, flax, etc., is chiefly with the Baltic and Canada. Montrose is also the center of a fishery district. Pop. 12,427.

Montrose, JAMES GRAHAM, MARQUIS OF (1612-1650), son of the fourth earl of Montrose, was born at Montrose in 1612, studied at St. Andrew's, and afterwards made a prolonged stay on the Continent. In 1637 Montrose joined the Covenanters in their resistance to Episcopacy, and was sent to crush the opposition to the popular cause which arose in and around Aberdeen. In 1639 he was one of the leaders who were appointed to confer with Charles I. after which he went over to the royalist side, was created a marquis, and made commander of the royal forces in Scotland. With an army partly composed of Irish and Highlanders he gained in rapid succession the battles of Tippermuir and Bridge of Dee (1644), Inverlochy, Auldearn, Alford and Kilsyth (1645). He afterwards went to Austria, where he was made a marshal of the empire. Returning to Scotland in 1650, with an ill-organized force, he was defeated, captured and executed without trial, May 21, 1650.

Montserrat (mont-sér-rat'), one of the British West Indies, belonging to the Leeward group, lies about 27 miles S. W. of Antigua, and has an area of 32 sq. miles, mostly mountainous and barren. The principal exports are sugar and lime-juice. Its only town is Plymouth. Montserrat was discovered by Columbus in 1493, and was colonized by the British in 1632. Pop. 12,215, of whom it is estimated, not more than 200 are whites.

Monza (mon'za), a town in North Italy, 10 miles N. E. of Milan, is situated on the Lambro. It is the ancient Modica. The town is of great antiquity. Pop. 32,000.

Moody (mö'di), DWIGHT LYMAN, evangelist, born at Northfield, Mass., in 1837; died in 1899. He went to Chicago in 1856, engaging in business and carrying on an active missionary work in association with Ira D. Sankey, an effective singer. They held religious services in many cities of the United States and Britain and had remarkable success. During the Civil War he was in the service of the Christian Commission. He founded the Northfield Seminary and Mt. Hermon Boys' School. He published his sermons and other works.

Moody, JOHN, an American statistician, born in Jersey City, New Jersey, in 1868. He devoted much attention to railroad and financial statistics; founded in 1900 *Moody's Manual of Railroads and Corporation Securities* and in 1905 Moody's Magazine.

Moody, WILLIAM H., statesman, was born at Newbury, Mass., in 1853. He was district attorney for the eastern district of Massachusetts, 1890-95; member of Congress 1895-1902; Secretary of the Navy 1902-04; Attorney General 1904-06. He was appointed a justice of the Supreme Court in 1906; but resigned because of illness in 1910.

Moody, WILLIAM VAUGHN, American poet, born in Spencer, Ind., July 8, 1869; died October 17, 1910. He was graduated at Harvard, 1893, where he was assistant in English, 1894-95.

From 1895 to 1901 he was instructor, and from 1901 to 1907, assistant professor in English in the University of Chicago. He edited the 'Cambridge' edition of Milton; and with Robert Morss Lovett prepared a *History of English Literature* (1902) and *A First View of English Literature* (1905). His *Ode in Time of Hesitation* (1900) showed splendid mastery of style and lyrical movement and brought Moody almost immediate recognition as a poet. His books of verse are *Poems* (1901) and *The Fire-Bringer* (1904); his plays *The Masque of Judgment* (in verse, 1900), *The Great Divide*, produced in 1907, and *The Faith Healer*, produced in 1909.

Moon (mön), one of the secondary planets and the satellite of the earth, revolves round the latter in an elliptic (almost circular) orbit, in one sidereal month (see *Month*), at a mean distance of 238,840 miles, its greatest and least distances being 252,970 and 221,000 miles. Its mean diameter is 2163 miles; its surface is about 1/13 (14,600,000 sq. miles) of that of the earth; the volume 1/49; the mass about 1/81; and the mean density a little more than ⅔. A mass weighing 1 lb. on the earth's surface would weigh about 1/6 lb. on the moon's surface. For every revolution in its orbit the moon rotates once on its axis, so that the same portion of the surface is constantly turned towards the earth; but in virtue of an apparent oscillatory motion, known as libration, about 4/7 of the surface is presented at one time or another to terrestrial observers. If the moon's orbit were in the plane of the ecliptic, solar and lunar eclipses would occur monthly. The orbit is, however, inclined 5° 8′ 40″ to the ecliptic, so that the meridian altitude has a range of 57°. The point of the orbit nearest the earth is called the *perigee*, the farthest, the *apogee*. An eclipse of the moon occurs when it passes into the earth's shadow; when it prevents the sun being seen there is an eclipse of the sun. (See *Eclipse*.) The changes in the appearance of the moon, described by the words waxing and waning, are known as *phases*. The four chief phases, occurring at intervals of 90° in the lunar orbit, are New Moon, when it is between the earth and sun (*i. e.*, in conjunction with the sun), and so turns an unilluminated side to the earth; First Quarter, when one-half of the illuminated disc (*i. e.*, one quarter of the entire lunar surface) is visible; Full Moon, when the whole illuminated disc is presented to the earth; and Last Quarter, when once more only half of the disc is visibly illuminated. Between new moon and full moon the moon is said to *wax*; on the rest of its course it *wanes*. When more than a semicircle is visible it is said to be *gibbous*, when new or full it is said to be in its *syzygies*. On the visible portion of the lunar surface there is either no atmosphere or an exceedingly rare one, and no traces of organic life have been observed. As each portion is alternately in sunlight and in shade for a fortnight at a time, and as no atmosphere has been detected, it is conjectured that the lunar extremes of heat and cold far exceed the greatest terrestrial extremes. The surface of the moon is mainly occupied by mountainous masses, most of which are named after eminent scientific men. They sometimes appear detached as precipitous peaks, more frequently they form vast continuous ranges, but the most prevalent form is that of crater-mountains, sometimes 8 to 10 miles in diameter, and giving evident traces of volcanic action. Certain crater-like formations, which have still greater diameters, are generally spoken of as 'walled plains.' Larger still are the 'gray plains,' which were at one time taken for seas, before the absence of water from the lunar surface was demonstrated. Some of the mountains have been estimated to be over 24,000 feet in height, from observation of their shadows. Very peculiar ridges of comparatively small elevation extend for great distances, connecting different ranges or craters. The so-called 'rilles' or 'clefts' are huge straight furrows of great length (18 to 90 miles), now generally believed to be caused by cracks in a shrinking surface. There are also valleys of various sizes, and 'faults' or closed cracks, sometimes of considerable length. In reading descriptions of the visible peculiarities of the moon, it should be remembered that the highest telescopic power yet applied to that planet is only equivalent to bringing it within about 40 miles of the naked eye. The attraction of the sun for the earth and the moon tends to diminish their mutual action. When the moon is at new or full (in syzygies) the mutual attraction of the earth and moon is lessened by the sun more than usual, whereas it causes a small increase in the mutual action when the moon is in quadrature (when the line from the earth to the moon is at right angles to the line from the earth to the sun); again, the sun exerts a direct tangential acceleration on the moon which is positive (or towards the sun) when the moon is nearer the sun than the earth, and negative when the moon is further away than the earth: these two produce what is called the *moon's variation*, which, on the whole, is such that in each lunation the moon's velocity is greatest when

she is in syzygies and least when nearly in quadrature. For the influence of the moon on tides see *Tides*.

Moon, MOUNTAINS OF THE, the name given, on the authority of Ptolemy, who thus designates the range in which he places the sources of the Nile, to a chain of mountains long supposed to extend across the whole African continent at its broadest part. In reality no such range exists, though there are numerous different mountain systems in that extensive region.

Moonshiner, a term applied in the Southern and Western States to the makers of 'moonshine' or illicit whisky. The term came from the secrecy of their operations, frequently conducted at night, so as to evade the revenue officers.

Moonstone. See *Adularia*.

Moore (mōr), JOHN, Scottish novelist and physician, born at Stirling in 1730; died in 1802. His best known work is his novel of *Zeluco* (1789), which seems to have exerted a considerable influence over Byron.

Moore, GEORGE, an Irish author, born in Ballyglass County in 1853. He has written poems and critical works and is one of the founders of the Irish Theater, but is best known for his novels, strongly realistic, in the style of the French school. His novels include *A Midsummer's Night* (1884), *Esther Waters* (1894), *Evelyn Innes* (1898), *The Untilled Field* (1903), and *The Lake* (1905).

Moore, SIR JOHN, a celebrated British general, the son of the preceding, was born at Glasgow in 1761; killed at Corunna in 1809. Having obtained an ensign's commission in the 51st Regiment, he served at Minorca, in the American war, as brigadier-general in the West Indies (1795), in Ireland during the rebellion of 1798, in Holland in 1799, and in Egypt in 1801, where he was severely wounded in the battle which cost Sir Ralph Abercrombie his life. Moore was now regarded as the greatest living British general, and in 1805 he was knighted. In 1808 he was appointed commander-in-chief of the British army in Portugal to operate against Napoleon. He advanced to Salamanca in spite of the gravest difficulties, but was finally compelled to retreat to Corunna, a distance of 200 miles, in face of a superior force. This he accomplished in a masterly manner; but the absence of the fleet to receive his army forced him to a battle against Marshal Soult, in which Moore fell, mortally wounded, in the hour of victory (January 16, 1809).

Moore, THOMAS, the national poet of Ireland, was born in 1779 in Dublin, where his father was a grocer; died near Devizes in 1852. From Trinity College, Dublin, he passed in 1799 to the Middle Temple in London, nominally to study law; but he almost immediately formed a connection with the fashionable and literary society of which he was so long an ornament, and in 1800 he was permitted to dedicate his Translation of the *Odes of Anacreon* to the Prince of Wales. His next venture, the *Poetical Works of the late Thomas Little*, though partly written in a licentious vein, which he afterwards regretted, increased his reputation; and in 1803 Lord Moira obtained for him the office of registrar of the admiralty court at Bermuda. Moore went out, but almost immediately appointed a deputy, and returned to England via the United States and Canada, and in 1806 published his *Odes and Epistles*. The severe castigation of this work

Thomas Moore.

by Francis Jeffrey in the *Edinburgh Review* led to a hostile meeting between the critic and the author, but the duel was interrupted by the authorities before a shot was fired. An allusion in *English Bards and Scotch Reviewers*, by Lord Byron, to a malicious report that the pistols on this occasion had been loaded only with powder, also produced a challenge from Moore, but matters were afterwards peaceably arranged. Both Jeffrey and Byron were subsequently among the warmest friends of Moore. In 1807 Moore agreed to write words for a num-

ler of Irish national airs, arranged by Sir John Stevenson. In these *Irish Melodies*, which were not finished till 1834, he found the work for which his genius was peculiarly fitted, and it is on them that his poetic reputation will mainly rest. With *The Intercepted Letters:* or, the *Twopenny Post Bag*, by Thomas Brown the Younger (1812), Moore entered upon the field of political and social satire, in which his wit and playfulness found good account; other works of this kind are the *Fudge Family in Paris* (1818); *Rhymes on the Road* (1823); *Memoirs of Captain Rock* (1824), etc. His most ambitious work, the gorgeous Eastern romance of *Lalla Rookh*, was published in 1817, and brought its author £3000, but two years later he was compelled to retire to France in order to avoid arrest for a debt of £0000, afterwards reduced to about £1000, for which the dishonesty of his deputy at Bermuda had rendered him liable. He returned to England in 1822, with the poem, *The Loves of the Angels*, and ultimately succeeded in paying the debt by his literary exertions. *The Life of Sheridan* was produced in 1825, and *The Epicuream*, a prose romance, in 1827. Next came the *Life of Lord Byron*, for which he received nearly £5000, and the *Life of Lord Edward Fitzgerald*. His remaining works include *The Summer Fête*, a poem; *Travels of an Irish Gentleman in Search of a Religion*, a serious apology for Roman Catholicism, and (in 1834) a *History of Ireland*. Moore's *Journal and Correspondence* was published by his friend Lord John Russell in 1852-56.

Moor-fowl. See *Grouse.*

Moorhead, a city, county seat of Clay Co., Minnesota, on Red River of the North, opposite Fargo, N. D. Seat of Concordia College and State Normal School. Has foundry, flour mill, brick and concrete works, etc. Pop. 5720.

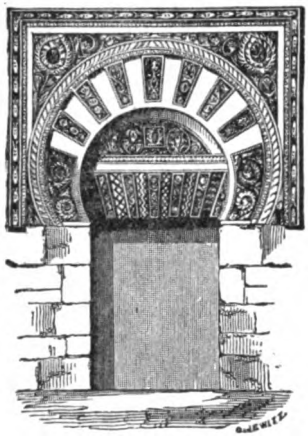
Moor-hen, or GALLINULE. See *Gallinule.*

Moorish Architecture (mŏr'ish), is that form of Saracenic architecture which was developed by the Moslem conquerors of Spain in building their mosques and palaces. Its main characteristics are—the horseshoe arch, varied by the trefoil, cinquefoil, and other forms of arch; profuse decoration of interiors by elaborately designed arabesques in low relief, enriched by colors and gilding, as well as by geometrical designs worked in mosaics of glazed tiles; the slenderness of the columns in proportion to the supported weight; and the curious stalactitic pendentives by which the transition is effected from the rectangular ground plan to the arched or domed roof. An important specimen of this style is the mosque of Cordova, now the cathedral, which was begun by Caliph Abd-el-Rahman (786 A.D.), completed by his son, and subsequently much altered. It consisted originally of eleven aisles, and the eight aisles which were afterwards added (976-1001) made it one of the largest buildings in Europe, but the effect of its great extent, 420 feet by 375, is marred by its height, which is only about 30 feet to the roof. Another notable specimen of

Moorish Decoration—Court of the Alhambra.

Moorish architecture is the Giralda or cathedral tower of Seville. It is supposed to have been built by Abû Yusûf Yakûb (1171 A.D.) as a tower of victory, and was used by the Moslems as a minaret or mueddin-tower. The base is a square of about 50 feet, from which the tower rises straight for 185 feet, and is now crowned by a belfry added in the sixteenth century. The lower part of this tower is nearly plain, but from about one-third of its height upwards it is enriched by sunk panels filled with ornamentation in relief, which give lightness and grace to the structure without affecting its general massiveness. The most

characteristic Moorish palace in existence is the Alhambra in Granada, an immense structure of simple and rather forbidding exterior, but within gorgeous almost be-



Moorish Doorway, Cordova.

yond description. (See *Alhambra.*) In this palace are found to perfection the distinctive characteristics of Moorish architecture.

Moors (mŏrz), a Mohammedan, Arabic-speaking race of mixed descent, forming part of the population of Barbary, and deriving their name from the Mauri, the ancient inhabitants of Mauretania, whose pure lineal descendants are, however, the Amazirgh, a branch of the Berbers. The modern Moors have sprung from a union of the ancient inhabitants of this region with their Arab conquerors, who appeared in the seventh century. As the Mohammedan conquerors of the Visigoths in Spain (711-713) came from North Africa, the name Moor was also applied to them by Spanish chroniclers, and in that connection is synonymous with *Arab* and *Saracen.* These Moors pushed northwards into France, until their repulse by Charles Martel at the great battle of Tours in 732, after which they practically restricted themselves to Spain south of the Ebro and the Sierra Guadarrama. Here, for centuries, art, science, literature and chivalry flourished among them, while the rest of Europe was still sunk in the gloom of the dark ages. Their internal dissensions and divisions, however, weakened them in face of the new Christian kingdoms of Aragon and Castile, and before the close of the thirteenth century their possessions were limited to the kingdom of Granada. This, too, was finally subdued by Ferdinand the Catholic in 1492; and while great numbers of the Moors emigrated to Africa, the remainder, under the name of *Moriscos,* assuming in great part a semblance of Christianity, submitted to the Spaniards. The cruel proselytizing zeal of Philip II, however, excited a sanguinary insurrection among the Moors in 1568-70, which was followed by the banishing of many thousands. In 1610 Philip II expelled the remainder, the most ingenious and industrious of his subjects. Between 1492 and 1610 about 3,000,000 Moriscos are estimated to have left Spain. The expulsion of the Moors was one of the chief causes of the decadence of Spain; for both agriculture and industries fell into decay after their departure. The expelled Moors, settling in the north of Africa, finally developed into the piratical states of Barbary, whose depredations were a source of irritation to the civilized powers even till well into the last century.

Moorshedabad. See *Murshidabad.*

Mooruk (mō'ruk; *Casuarius Bennettii*), a variety of cassowary, inhabiting the island of New Britain, where it is made a great pet with the natives. It is very swift of foot.

Moorva. Same as *Bowstring Hemp.*

Moose. See *Elk.*

Moose Jaw, a town of Saskatchewan province of Canada, 398 miles w. of Winnipeg. Pop. 13,824.

Moquis, (mō'kez), the name of an Indian people, of semicivilized culture, living in Northern Arizona. Coronada's expedition of 1540 was to the seven towns of the Moquis. They were subdued by the Spaniards, but gained their independence by a revolt in 1680. They cultivate the soil and are kind hearted and hospitable. Their houses are built of stone, set in mortar, and on top of almost inaccessible hills or mesas.

Mora (mō'ra), a game known to the ancients, and still in vogue in the south of Europe. The two players simultaneously present each a hand, with some of the fingers extended, at the same moment endeavoring to guess the aggregate number of fingers so extended. An accurate guess counts one; five is game.

Moradabad (mō-rud-ä-bäd'), a town of India, in Rohilkhand, in the Northwest Provinces, 75 miles east of Meerut, on the Ramganga. It is noted for its metal work, and is a center of local trade. It was founded by the Ro-

hills Afghans, and has a Protestant church and American mission, and a cantonment. Pop. 75,128.

Moraine. See *Glaciers.*

Morales (mo-rä'lās), LUIS DE, a Spanish painter, surnamed *El Divino*, probably because he painted sacred subjects almost exclusively, was born at Badajoz in 1509; died there in 1586. Invited to the court of Philip II, he lived for a short time at Madrid, and Philip latterly granted him a pension. His *Mater Dolorosa*, at Madrid, is considered his masterpiece. He is praised for his skilful gradation of tints, and his power of giving expression to resigned sorrow.

Morality (mu-ral'i-ti), or MORAL PLAY, a sort of allegorical play, embodying moral discourses in praise of virtue and condemnation of vice, the dialogue being carried on by personifications of virtues and abstract qualities. The Devil of the earlier Miracle Plays, which were never entirely superseded by the Moralities, became the Vice of the latter; sometimes he appears in person, with the Vice as his attendant. Moralities first appeared in England about the beginning of the reign of Henry VI, and lingered until the reign of Elizabeth (about 1600). For a time they maintained their interest by reference to current topics, but finally gave way to the regular drama.

Moral Philosophy. See *Ethics.*

Morat (mo-rä; German, *Murten*), a town (2263 inhabitants) in the Swiss canton of Freiburg, on the Lake of Morat, 16 miles west of Bern. Here, on the 22d of June, 1476, the Swiss Confederacy, aided by some allies from the Rhenish cities, routed with great slaughter Charles the Bold, duke of Burgundy.

Moratin (mo-ra-tēn'), LEANDRO FERNANDEZ, a Spanish writer of comedies, born in 1760 at Madrid; died at Paris in 1828. Moratin was the author of odes, sonnets, epistles, and other poems, as well as of five successful comedies, composed on the regular French models. He also wrote the valuable *Origenes del Teatro Español.*

Morava (mō'rä-va), the chief river of Moravia, a tributary of the Danube, which it joins after a course of about 200 miles.

Moravia (mō-rā'vi-a; German, *Mähren*), a province of Czecho-Slovakia, formerly in the Austrian Empire; area 8578 sq. miles. It is enclosed by the Carpathians and other mountains, and belongs almost entirely to the basin of the March or Morava (from which it takes its name), a tributary of the Danube. The minerals are of considerable importance, and include iron, coal, graphite and slate. Nearly 97 per cent. of the soil is productive, the chief crops being rye, oats, barley, potatoes, beet-root and flax. Fruit is very abundant, and large quantities of wine are annually produced. Sheep in great numbers, and cattle, are reared. The woolen industries of Bohemia are of world-wide fame, and linen and cotton, beet-root sugar, iron and steel goods, machinery, beer and spirits are also turned out in large quantities. The chief towns are Brünn, Olmütz, Znaim and Iglau. In 1029 Moravia was united to the kingdom of Bohemia, with which it passed to Austria in 1526. In 1849 it was made a separate crownland within the Austrian empire. In 1918, at the close of the European war, on the dissolution of the Austro-Hungarian monarchy, it united with Bohemia, forming the state of Czecho-Slovakia (q. v.). Pop. 2,650,000. About 70 per cent of the inhabitants are Czechs.

Moravian Brethren, also called UNITED BRETHREN, HERRNHUTER, and officially UNITAS FRATRUM (Unity of Brethren), a Protestant sect or church which originally sprang up in Bohemia after the death of John Huss. (See *Bohemian Brethren.*) After the sanguinary religious wars which prevailed in Bohemia until 1627 they were everywhere almost annihilated. Their doctrines were still, however, secretly cherished in Moravia, and in 1722 a colony emigrated thence, and were invited by the Lutheran Count Zinzendorf to settle on his estate near Berthelsdorf, in Saxony, where they built the town of Herrnhut, still the headquarters of the church. The doctrines of the brethren had hitherto been more in harmony with the Calvinistic than with the Lutheran form of Protestantism, but under the influence of Count Zinzendorf, who himself became a bishop, they attached themselves to the Lutheran Church. From Herrnhut the Moravian Church extended to other points in Germany, and to England and the United States (1735). These three countries form self-supporting home provinces of the Unitas, to which in 1889 the West Indies, hitherto a mission field, was added as a fourth. Each has its synod and elders' conference, subject to the General Synod, which meets at Herrnhut once every 7-12 years. The Moravian Brethren have always distinguished themselves as missionaries, and maintain stations in North and Central America, South

Africa, Australia and Tibet. The Moravian Brethren are distinguished for the Puritanical simplicity of their life and manners, and for their earnest, if somewhat narrow and austere, piety. The practice of living in exclusive communities or villages still obtains in Germany. Within these communities the unmarried men sometimes live in common in a building assigned for that end, the unmarried women in another, widows in a third. Moravian schools deservedly enjoy a high reputation even among those who are not members of the community. The clergy are divided into bishops, priests, and deacons. The Moravian church is estimated to number about 115,000 adherents. In the United States there are about 18,000 members.

Mora-wood. Same as *Fustic.*

Moray. See *Elgin.*

Moray Firth (mur'ā), the great gulf on the northeast coast of Scotland, containing at its widest extent the sea between Duncansby Head in Caithness-shire and Kinnaird Head in Aberdeenshire, a distance of 78 miles; but in a restricted sense that portion which lies between Tarbat Ness and Lossiemouth (21 miles), and which extends into the Cromarty and Beauly Firths.

Moray, or MURRAY, JAMES STUART, EARL OF, half-brother of Mary Queen of Scots, natural son of James V of Scotland and Margaret Erskine, born about 1533. In 1558 he joined the Lords of the Congregation, and was soon recognized as the head of the reformers' party. On Mary's return from France Moray became her favored adviser, but her marriage with Darnley and subsequent events caused a breach between them which constantly widened. On the deposition of Mary he was appointed regent, defeated her forces at Langside on her escape from Lochleven (1568), and appeared as evidence against her at her trial in England. He consequently incurred the bitter hatred of the queen's party, but earned from the people the title of 'Good Regent.' In 1570 he was shot in the streets of Linlithgow by Hamilton of Bothwellhaugh, who was actuated by private grievances.

Morayshire. See *Elgin.*

Morbihan (mor-bi-äṅ), a northwestern department of France, on the Bay of Biscay; area, 2624 square miles, of which less than half is arable. The northern part is hilly, but the rest is low and level, especially along the coast, which is lined by several fertile islands and is deeply indented. The plains on the coast are fertile, and the ordinary fruits are abundant; cider, butter and honey are among the chief products. The fisheries are important, and the general trade, favored by the harbors on the coast and by canals, is considerable. Iron is the chief mineral. The chief town is Vannes. Pop. 573,152.

Mordant (mor'dant), a substance frequently employed to fix the colors in dyeing. See *Dyeing.*

Mordaunt (mor'dânt), CHARLES. See *Peterborough, Earl of.*

Mordvins (mord'vinz), a race of people inhabiting European Russia, and belonging to the Bulgaric or Volgaic group of the Finnish family of peoples. They are found chiefly in the governments of Penza, Simbirsk, Saratov, Samara, Nishegorod and Tamboy. Their chief sources of livelihood are cattle-rearing, hunting, fishing and bee-keeping. Their numbers are estimated at 480,000.

More (mōr), HANNAH, popular writer on moral and religious subjects, born at Clifton, Bristol, about 1745; died there in 1833. Her talents early made her acquainted with Johnson, Burke, Garrick, and other literary men, and her plays, *The Inflexible Captive, Percy* and the *Fatal Captive,* were fairly successful. After the production of the last, in 1779, she devoted herself to the composition of works having a moral and religious tendency, the diffusion of tracts, and philanthropic labors. Her success was astonishing, the profits of her works during her lifetime exceeding £30,000. Her *Strictures on the Modern System of Female Education, Cœlebs in Search of a Wife, Practical Piety* and *Moral Sketches,* are among her best-known books.

More, HENRY, a divine and philosopher, born at Grantham, in Lincolnshire, in 1614; died at Cambridge in 1687. He studied at Eton, and was graduated at Christ College, Cambridge, in 1639. In the following year he published his *Psycho-Zoia,* or the *First Part of the Song of the Soul,* a blending of Christian, Cabbalist and Platonic doctrines. In 1675 he accepted a prebend in the cathedral of Gloucester, which it is supposed he took only to resign it to his friend Dr. Fowler. He also gave up his rectory of Ingoldsby, in Lincolnshire. In 1661 he became a fellow of the Royal Society. His writings are characterized by the belief that Plato had received through Pythagoras a knowledge of Hebrew theology and was also favored directly with supernatural communications. The most admired are his *Enchiridion*

Ethicum (1669) and *Divine Dialogues Concerning the Attributes and Providence of God.*

More, Sir Thomas, a chancellor of England, only son of Sir John More, a judge of the Court of King's bench; born in London in 1480, beheaded in 1535. A portion of his youth was spent in the family of Cardinal Morton, archbishop of Canterbury, and chancellor; and he was then sent to Oxford, and afterwards entered at Lincoln's Inn. He had already formed an intimate and lasting friendship with Erasmus. About 1502 he became a member of parliament, and immediately made for himself a place in history by upholding the privileges of the House of Commons to treat all questions of supply as their own exclusive business. On the accession of Henry VIII he was made under-sheriff of London. In 1514 he was envoy to the Low Countries, soon after was made a privy-councilor, and in 1521 was knighted. He appears to have ere this time considerably enriched himself by practice, and with his wife, a daughter of a gentleman of Essex named Colt, he kept up noble hospitality. In 1523 he became speaker of the House of Commons, and in 1529 succeeded Wolsey in the chancellorship. When Henry began his attacks on the papal supremacy More at once took up the position which his conscience dictated as a supporter of the old system. Henry marked him out for vengeance as an opponent of his matrimonial views, and More endeavored to shield himself by retiring from office. He was requested to take the oath to maintain the lawfulness of the marriage with Anne Boleyn. His refusal to do so led to his committal to the Tower, trial for misprision of treason, and execution. His chief work is the *Utopia* (in Latin), a philosophical romance describing an ideal commonwealth, which evinces an enlightenment of sentiment far beyond that of his time.

More'a. See *Greece.*

Moreau (mō-rō), Jean Victor, a French general, born at Morlaix, in Bretagne, in 1763; died in 1813. Bred to the law, he early displayed a predilection for the military profession, and in 1789 he joined the army of the north at the head of a battalion of volunteers. He so distinguished himself that he was named commander-in-chief of the army of the Rhine and Moselle in 1796, destined to threaten Vienna simultaneously with the invasion of Italy by Bonaparte. His conduct of the operations, and especially of the retreat to the French frontier in the face of a superior army, showed exceptional strategic power. In 1799 he was in command of the army of Italy, and next year had the command of the armies of the Danube and the Rhine. The passage of these rivers, and a series of victories, ending with Hohenlinden, induced the Austrians to ask for peace. Being found guilty of participation in the conspiracy of Pichegru and Cadoudal against Napoleon (1804), he had to go into exile, and purchased an estate in Pennsylvania, where he resided some years. He was subsequently induced to aid in the direction of the allies' armies against his own country, but was mortally wounded in the battle before Dresden in 1813, and died a few days later.

Morecambe Bay (mōr'kam), a bay on the northwest coast of England, running into Lancashire and Westmoreland. It is very shallow, and proposals to reclaim the greater portion of it have been frequently made.

Moreen (mu-rēn'), a woolen or woolen and cotton fabric made in imitation of moiré (that is, having a watered appearance), and used for curtains, dresses, etc.

Morel (mor'el), a genus of edible mushrooms (*Morchella*), applied specifically to *Morchella esculenta.* It is much used to flavor gravies.

Morelia (mō-rā'-lē-a) a town of Mexico, capital of the State of Michoacan, 6400 feet above sea level. It has cotton and tobacco factories. Pop. 40,042.

Morelos (mō-rā'lōs), an inland State of Mexico, south of Mexico, containing the volcano of Popocatepetl; area, 1895 sq. miles; pop. 183,700.

Morenci (mo-ren'si), a town of Greenlee Co., Arizona, near New Mexico border, in a copper-mining district. Pop. (1920) 5100.

Moresnet (môr-nā'), one of the smallest republics in the world, with an area of about one and a half square miles, lying between Belgium and Prussia, four miles southwest of Aix-la-Chapelle. It attained self-government in 1841. The people are partly Dutch, partly Belgian and partly German. Prior to the European war (1914-) the republic was under the joint suzerainty of Belgium and Germany. Moresnet remained neutral during the war, and its 3500 inhabitants enjoyed unparalleled prosperity.

Moreton Bay (mōr'tun), the port of Brisbane, the capital of Queensland, in the Commonwealth of Australia. It is about 40 miles long N. and S. by 17 miles wide, and receives the waters of the Brisbane and other rivers. The anchorage is good.

Moreton Bay Pine. See *Araucaria.*

Moreto y Cabana (mo-rā'tō ē kä-bän'yä), Agustin, a Spanish dramatist, born at Madrid in 1618. He studied at Alcala (1634-39), entered the household of the Cardinal Archbishop at Toledo, took holy orders, ultimately withdrew from the world to an ascetic religious brotherhood, and died in 1669. He was a friend and largely an imitator of Lope de Vega and Calderon, but by his developments on the humorous side is sometimes regarded as the founder of true comedy in Spain. He left more than 200 works, one of which, *El Desden con el Desden* ('Scorn for Scorn'), is classed among the four leading products of the Spanish drama.

Morgan (mōr'gan), Daniel, Revolutionary soldier, born in New Jersey in 1736, and served with distinction in the war of the Revolution. He was prominent in Arnold's expedition against Quebec, was in command of the riflemen at the battle of Saratoga in 1777, and was in command at the battle of the Cowpens in 1781, where he signally defeated the British under Tarleton. Congress voted him a gold medal for his gallantry. He died in 1802.

Morgan, John Hunt, Confederate soldier, born at Huntsville, Alabama, in 1825. He took command of a troop of cavalry in 1861, made several daring raids through Kentucky, and in 1863 crossed the Ohio with about 4000 men, and made a dashing ride through Indiana and Ohio, destroying bridges, railroads, etc. He was pursued and captured, but escaped from prison and continued his career till killed in a battle at Greenville, Tennessee, September 4, 1864.

Morgan, John Pierpont, financier, was born at Hartford, Connecticut, in 1837. He became connected in 1857 with the banking firm of Duncan, Sherman & Co., and in 1871 was made a partner of the firm of Drexel, Morgan & Co., which afterwards became J. Pierpont Morgan & Co. In this capacity he entered into wide financial operations as a railroad and industrial organizer, and in 1901 created the largest business concern in existence, the United States Steel Corporation, with a capital of $1,100,000,000 and working funds of $200,000,000. From that time he continued in broad and bold operations and became the leading figure in American finance. He died in Rome, March 31, 1913.

Morgan, Lewis Henry, archæologist, born at Aurora, New York, in 1818; died in 1881. He became a lawyer at Rochester, and was elected to the State Assembly in 1861 and to the Senate in 1868. He became one of the founders of the modern school of ethnological science, which bases its work on the study and comparison of primitive civilizations. His reputation rests on his able *League of the Iroquois* and his *Systems of Consanguinity and Affinity.* He also wrote *The American Beaver.*

Morgan, Sydney, Lady, authoress and brilliant society figure, born somewhere between 1770 and 1785, the actual date having been whimsically concealed by her. Her father was an actor on the Dublin stage, named MacOwen or Owenson. She early attracted attention by her musical and other accomplishments. In 1797 she published a volume of poems, followed by a collection of Irish songs, and two novels, entitled *St. Clair,* and the *Novice of St. Dominick.* In 1806 appeared her *Wild Irish Girl,* a novel which passed through seven editions in two years. In 1811 she married Sir Charles Morgan, an eminent physician. Among her other writings are the novels of *O'Donnell, Florence Macarthy,* and the *O'Briens and the O'Flahertys;* the *Life and Times of Salvator Rosa; Woman and Her Master;* and *Passages from My Autobiography.* She died in 1859.

Morgan City, a city of St. Mary's Parish, Louisiana, on the Atchafalaya Bayou, 80 miles from New Orleans. It has lumber, sugar, fish and oyster interests. Pop. 5477.

Morganatic Marriage (mor-ga-nat'ik), in some European countries, one in which it is stipulated that the wife (who is inferior in birth to the husband) and her children shall not enjoy the privileges of his rank nor inherit his possessions. The common law of Germany permits such marriages only to the high nobility.

Morgarten (mōr-gär'tn), a place in Switzerland, Canton Zug, where a small body of Swiss in 1315 totally defeated a large force of the Austrians.

Morgantown, a city, capital of Monongalia Co., West Virginia. It lies on the Monongahela River, 60 miles S. of Pittsburgh, has large glass works and other industries, and is the seat of the West Virginia University. Pop. 9150.

Morghen (mōr'gen), Raphael Sanzio, an Italian engraver, born in 1758. He studied at Rome under Volpato, whom he assisted in engraving the famous pictures by Raphael in the Vatican. He settled in Florence in 1793 as professor of engraving in the Academy

of Arts, and died in 1833. His works number about 200 in all, many of them of large size. Among the chief are the engraving of Leonardo da Vinci's *Last Supper;* the *Transfiguration*, after Raphael; a *Magdalen*, after Murillo; a *Head of the Saviour*, after da Vinci; the *Car of Aurora*, after Guido; *The Hours*, after Poussin; the *Prize of Diana*, after Domenichino; the *Monument of Clement XIII*, after Canova; *Theseus Vanquishing the Minotaur;* portraits of Dante, Petrarca, Ariosto, Tasso, etc.

Morgue (morg), La, in Paris, a place behind Notre Dame, where the bodies of unknown persons who have perished by accident, murder, or suicide are exposed, that they may be recognized by their friends. From this all such places in English-speaking countries are given the name of morgue.

Morier (mō'ri-ėr), James, an English novelist, born in 1780. He accompanied Lord Elgin as private secretary on his embassy to Constantinople, made the campaign of Egypt in the suite of the grand vizier, was taken prisoner by the French, and after his release became from 1810 to 1816 British envoy at the court of Persia. He died at Brighton in 1849. In 1812 and in 1818 he published accounts of two *Journeys Through Persia to Constantinople*, but he was best known by his *Adventures of Hajji Baba of Ispahan* (1824); *Adventures of Hajji Baba in England* (1828); *Zohrab the Hostage* (1832); *Ayesha, the Maid of Kars* (1834).

Morinda (mor-in'da), a genus of Asiatic trees of the cinchona family, the bark or roots of which yield red and yellow dyes.

Moringaceæ (mor-in-gā'se-ē), a nat. order of plants, closely akin to Leguminosæ and containing only the genus *Moringa*. See *Ben*.

Morion of the time of Queen Elizabeth.

Morion (mō'ri-un), a helmet of iron, steel, or brass, in general conformation resembling a hat, often having a crest or comb over the top, being without beaver or visor, introduced into Britain either from France or Spain about the beginning of the sixteenth century.

Morisco. See *Moors*.

Morisonians. See *Evangelical Union*.

Morlaix (mor'lā), a seaport of France, department of Finistère, 34 miles northeast of Brest, on a small estuary formed by the junction of two streams, which united to form the Doesen; with a government tobacco factory, and a good trade. Pop. 13,875.

Morland (mor'land), George, painter, born in London in 1763; died in 1804. He married a sister of James Ward, the animal painter, and William Ward, the engraver, and lived a very dissipated life, many of his best pictures being painted within the rules of a debtor's prison. His work deals with rustic and homely life, and the best of it is now highly prized by connoisseurs. He had extraordinary popularity during his lifetime, and about 250 of his pictures are said to have been engraved. The *Interior of a Stable*, now in the National Gallery, is perhaps his masterpiece.

Morley (mor'li), Henry, author, born in London in 1822; educated at King's College, of which he was an honorary fellow; practiced medicine in Shropshire and teaching in Liverpool; and went to London as a journalist in 1851. From 1857 to 1865 he was English lecturer at King's College; after the latter year he was professor of English language and literature at University College, London, and also at Queen's College. In 1882 he became principal of University Hall. His more important works are connected with the history of English literature, and include *First Sketch of English Literature, English Writers, English Literature in the Reign of Victoria*, etc. He edited various series of literary works, besides writing many biographies, two volumes of *Fairy Tales*, etc. He died in 1894.

Morley of Blackburn, John, first viscount (1838-), an English author and statesman, born at Blackburn, Lancashire. He graduated from Oxford University, 1859, and was for some time editor of the *Literary Gazette*. In 1863 he became editor of the *Fortnightly Review* and editor of *Macmillan's* in 1883. He was elected Member of Parliament for Newcastle-on-Tyne, 1883-95; chief secretary for Ireland in 1886 and from 1892 to 1895, supporting Gladstone in his Home Rule scheme; secretary of state for India, 1905-10; lord president of the council, 1910-14. He espoused the cause of the Boers in 1898, and was opposed to Britain's declaration of war on Germany in 1914, in which year he resigned from the cabinet, retiring to private life during the war. Among his published works are: *Life of Edmund Burke* (in English Men of Letters series), *Voltaire, Rousseau, Struggle for National Education, Compromise, Cobden, Studies in Literature, Oliver Cromwell, Life of*

Gladstone, Notes on Politics, and Recollections.

Mormons (Mor'monz), or more properly speaking the Church of Jesus Christ of Latter Day Saints, was founded in 1830 by Joseph Smith, a native of the United States, and others then dwelling in New York State. The distinguishing characteristics of the sect are, the belief in continual divine revelation, and a complete Apostolic organization. The Latter Day Saints accept both the Bible and the Book of Mormon as containing divine revelation. The Book of Mormon is held to be a history of America from the first settlement of the continent, which according to it took place after the destruction of the Tower of Babel, and up to and including the fourth century of our era, at which time lived the prophet Mormon, the reputed author of this work. Joseph Smith, then dwelling at Manchester, New York, affirmed in 1823 that an angel had appeared to him and revealed the hiding place of this ancient document, written on plates of gold and concealed in a hill in that vicinity. A document produced by Smith in 1829 was claimed by him to be a translation of this mysterious work, which was published in 1830, and was succeeded by a "Book of Doctrine and Covenants," a collection of special revelations claimed to be made to Smith and his associates, and dealing with all points connected with methods of worship and faith. The statement has been made that the Book of Mormon is an adaptation of a sort of historical romance written by one Solomon Spaulding in 1812. This, however, the Mormons emphatically deny, and declare that the discovery of the original Mss. of Spaulding's work, by Professor Fairchild, of Oberlin College, in 1884, corroborates their denial.

The Church of Jesus Christ of Latter Day Saints, the Mormon organization, was legally founded in Fayette, New York, on April 6, 1830. Its early career was one of persecution, the result being its removal to Kirtland, Ohio, in 1831; to Missouri in 1831-1838; to Nauvoo, Illinois, the City of Beauty, in 1839. It had grown largely during these migrations. In 1844 Joseph Smith and others were arrested on a charge of treason, which was never proven. On June 27, 1844, a mob broke into the jail where they were confined and shot him and his brother Hyrum. The Church was then scattered, and several aspirants for leadership arose, including Brigham Young, who had joined the Church in 1832. The adoption of polygamy as one of the tenets of the Mormon Church was the main cause of the persecution of its members, this becoming so active that in 1847 Brigham Young decided to migrate with his followers to Utah as a haven of rest in the wilderness. Here Salt Lake City was founded in 1849, and in the following years an active missionary work added largely to the Church membership. As early as 1862 Congress passed the Morrill Act to punish and prevent the practice of polygamy in the territories. This law was not inforced, but later acts of 1887 were, 1200 persons being convicted of polygamy and 12,000 disfranchised, the Church being dissolved. Finally, in 1890, the Mormon leaders repudiated the illegal system. On January 4, 1893, in response to a petition from the officials of the Church, pledging the membership to faithful obedience to the laws against polygamy, President Harrison issued a general pardon to all persons liable to the penalties of the Edmunds-Tucker Act of 1887, on condition that they had not violated its provisions since November 1, 1890. In 1896 Utah was admitted to the Union as a State, a clause prohibiting plural marriages being included in its constitution. Since then their settlements have spread through several of the Rocky Mountain States and into Canada and Mexico, their membership, in the census of 1910, being 310,000.

The migration to Utah did not comprise the whole body of Mormons, a considerable number remaining in the East. These repudiated polygamy, and by 1860 had developed a new organization under Joseph Smith, son of the founder. He was succeeded by his son, Frederick M. Smith, in 1914. The claims of Brigham Young to leadership were repudiated by this body, which claimed to maintain the original organization and faith. It has local societies in most of the States and in many foreign countries, and operates a large publishing plant in its interests at Lamoni, Iowa, the headquarters of this branch of the Mormon Church. Its membership in 1910 was 65,000.

Morocco (mō-rok'kō; Arabic name, *Moghreb-el-aksa*, the Extreme West), an empire or sultanate occupying the northwest extremity of Africa, bounded by the Atlantic Ocean, the Mediterranean, Algeria, and the desert; area, about 300,000 square miles. Pop. estimated at about 6,500,000. Its most remarkable natural feature is the Great Atlas, one of a series of five ranges extending from northeast to southwest. The mean elevation of the Great Atlas is 11,000 feet. Between the mountains and the sea are tablelands and

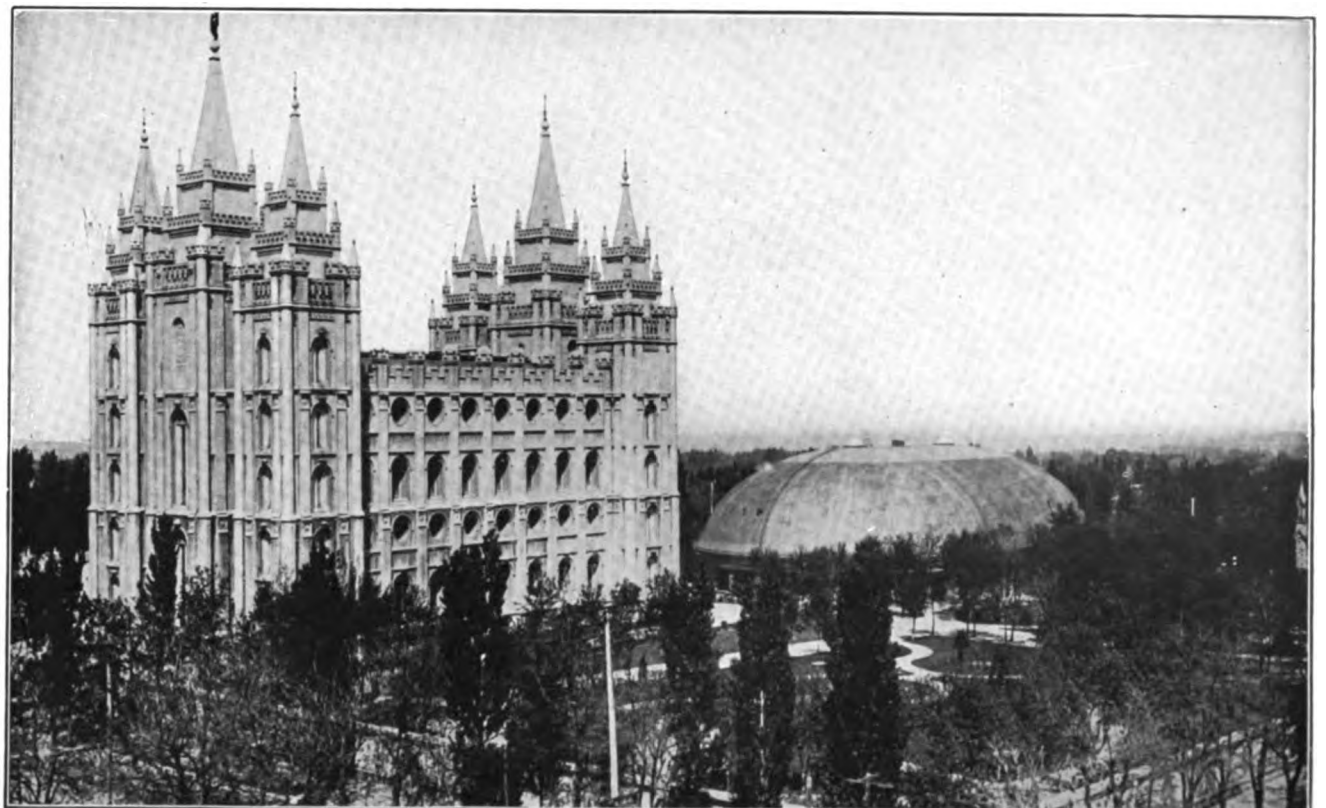


Photo by Brown Bros.

THE PRIDE OF THE MORMONS

The splendid Mormon Temple in Salt Lake City, which took forty years to build and cost $4,000,000. The low, egg-shaped building beside it is the great Tabernacle, an auditorium seating seven thousand persons and housing one of the largest organs in the world.

plains, some of them of great fertility. The rivers are unimportant, being mostly dry for part of the year, and generally diminishing in volume as they approach the sea. The coast offers few good harbors; the most frequented are Tangier, El-Araish (Laraiche), Rabat and Mogador. The climate in many parts is pleasant and temperate, in many others the summer heat is insufferable. The minerals include gold, silver, copper, iron and lead in larger or smaller quantities. The flora includes the esculent oak and cork oak; in the higher regions of the Atlas the cedar and Aleppo pine; the date palm and the dwarf palm east and south of the Atlas. Agriculture is in the lowest possible condition, and the annual production is calculated barely to supply the wants of the country. The cereal crops include wheat, barley and maize; but dhurra or millet constitutes the chief support of the population. The vine is cultivated only near towns for the sake of the fresh grapes and for the raisins. All the fruits of the south of Europe are cultivated to some extent. Among the wild animals are the lion, panther, jackal, hyena, wild boar, gazelle, and several species of large antelope. The locust is a cause of much devastation. The ostrich is found on the southern frontiers. Cattle and sheep are reared, and the spirited small horses for which the country was once famous are still numerous. There are large numbers of goats, which furnish a principal article of export—the well-known Morocco leather. In general, among the rural population, each family supplies all its own wants. In the towns, however, some manufacturers have sprung up, besides the well-known leather. Fez makes and exports the cloth caps which bear its name. Carpets, embroidered stuffs, pottery, arms, are also made. The trade is carried on by caravan with the interior, or by sea with European states, especially with Great Britain, next to which comes France. The Berbers are the oldest inhabitants of the country, and they devote themselves to agriculture rather than to pastoral pursuits. The Arabs form the bulk of the rural population in the plains; some of them are cultivators, and others are Bedouins. In the towns along the coast are found the Moors, and a considerable number of Jews inhabit all the commercial towns. To these must be added the negroes and their posterity of every shade. The civilization of Morocco has sunk to a low condition. The education at the schools and at the University of Fez does not go beyond the theology of the Koran. The public libraries, once famous, are now dispersed. Morality is represented as being in a deplorable state. The sovereign or sultan, styled by Europeans emperor, is absolute in the strictest sense. The imperial revenues are derived from arbitrary imposts on property, duties on imports and exports, monopolies, and fines or confiscations. The chief towns are Morocco and Fez, the one in the southwest, the other towards the northeast.—Morocco in ancient times formed part of Mauritania, and about 43 A.D. was incorporated in the Roman Empire. In the latter part of the seventh century the Arabs spread over North Africa, and took possession of Mauritania. Among ruling dynasties since then have been the Almoravides, Almohades, and others. The present dynasty, the ninth, was founded in 1648. In 1814 the slavery of Christians was abolished, and piracy was prohibited in 1817. The conquest of Algeria brought about complications with France, which led eventually to a dispute between France and Germany, and an international conference at Algeciras, Spain, in 1906. France was given police control of certain ports, the commercial rights of other nations to be observed, and France established a partial military occupation, with the tacit consent of the powers. In 1908-09 war existed between the Spanish forces at Melilla and the neighboring Riff tribes. After some reverses the Spanish were victorious and their position at Melilla was assured. A rebellion against Sultan Abdul led to his defeat in 1908, his brother Muley Hafid succeeding to the throne. In 1911 a controversy arose between France and Germany concerning their respective rights in Morocco, which ended in France transferring to Germany a considerable district in French Congo, in return for which France was left open to establish a protectorate in Morocco. American recognition of the French protectorate was announced by Secretary Lansing in a note dated January 17, 1917.

Morocco, formerly one of the capitals of Morocco, lies in the southwest of the country, on an extensive and fertile plain, 1500 feet above sea level It is nearly 6 miles in circuit, and is walled, though its walls and towers are in a ruinous condition. The streets are unpaved, dirty, narrow, and irregular. There are several open areas used as market places, a covered bazaar, and many mosques. Near the palace, which is on the south of the city, is the Jews' quarter (El Millah), a walled inclosure of about 1½ miles in circuit, one-half of it nearly in ruins, very crowded, and excessively filthy. There are several tan-

ning and leather dyeing establishments. Pop. estimated at 40,000 to 50,000.

Morocco, a fine kind of leather made from the skins of goats, imported from the Levant, Barbary, Spain, Belgium, etc., tanned with sumach, dyed, and grained, the last process being that which gives it its well-known wrinkled appearance. It is extensively used in the binding of books, upholstering furniture, making ladies' shoes, etc. Imitation moroccos are made from sheep-skins, so perfect in appearance that it is difficult to distinguish them, but they are entirely lacking in the durability of the real article. The art of preparing morocco is said to have been derived from the Moors.

Moron (mō'ron), a person whose mental development has been arrested at the point reached by the normal child of about 12 years. See *Mental Defectives.*

Moron (mō-rōn'), or MORON DE LA FRONTERA, a town of Spain, 32 miles S. E. of Seville, on the Guadaira. It has olive oil and other industries. Population, 18,000.

Morpeth (mōr'peth), a borough in England in Northumberland, on the Wandsbeck, 14 miles north by west of Newcastle. It has a fine old parish church in the decorated English style. Its manufactures are considerable, but there are large collieries in the vicinity. Pop. 7436.

Morpheus (mōr'fūs), in Greek mythology, the son of sleep and god of dreams.

Morphia (mōr'fi-a), MORPHINE (mōr'fēn), the narcotic principle of opium, a vegetable alkaloid of a bitter taste, first separated from opium in 1816. It forms when crystallized from alcohol brilliant colorless prisms of adamantine luster. As it is very slightly soluble in water it is never used alone medicinally, but it readily combines with acids, forming salts extensively used in medicine. In small doses it is powerfully anodyne; in large it causes death, with narcotic symptoms.

Morris (mor'ris), CHARLES, author, born at Chester, Pennsylvania, in 1833. After a period spent in teaching and clerkship he became an active author and compiler, producing numerous works. Among these are *A Manual of Classical Literature; The Aryan Race: Civilization, an Historical Review of its Elements; Man and His Ancestor; Historical Tales,* etc. He compiled *Half Hours with the Best American Authors* and other works. did editorial work on several cyclopedias, and edited *Winston's Cumulative Encyclopedia*

Morris, CLARA, actress, born at Cleveland, Ohio, in 1849. She became in 1861 a member of the ballet in the Academy of Music, Cleveland, and later was trained for the dramatic stage. Her greatest success was in the representation of strong emotional roles.

Morris, SIR EDWARD, Canadian statesman, born in St. John's, Newfoundland, of Irish parents, 1859. He entered Parliament for St. John's (1885), and joined the Whiteway Cabinet (1889). He was acting attorney-general for Newfoundland (1890–95), and in 1897 went to London as delegate to the Colonial Office He was the leader of the Independent Liberal Party (1898–1900); became a member of the Bond Cabinet (1901); and in 1908 was elected leader of the People's Party. From 1902 to 1907 he was attorney-general and minister of justice of Newfoundland, and since 1909 has been Premier of Newfoundland. He was a member of the Arbitration Board, 1910, and was sworn by King George V. as a member of his Privy Council. 1911.

Morris, GOUVERNEUR, statesman, was born in Westchester County, New York, in 1752, and adopted the legal profession. In 1777 he was elected to the Continental Congress, and was also a member of the New York Constitutional Convention, in which, against John Jay, he championed and won the cause of religious liberty. He removed to Philadelphia in 1780, and in 1787 was a member of the Philadelphia Convention that framed the Constitution of the United States, the final draft being his work. In 1792 he was sent as Minister to France and in 1800 was elected United States Senator from New York. He spent his later years in retirement, and died in 1816.

Morris, HARRISON SMITH, born at Philadelphia, Pa., 1856. He was director of the Pennsylvania Academy of Fine Arts, 1892–1905, editor of Lippincott's Magazine, 1899–1905, and art editor of the *Ladies' Home Journal,* 1905–08. In 1911 he was United States commissioner-general to the Roman Art Exposition, New York.

Morris, JOHN GOTTLIEB, American clergyman, born in York, Pa., 1803; died in 1895. He was graduated at Dickinson College, and in theology at Princeton (1826). He was pastor of Lutheran churches in Baltimore and Lutherville, Md., and did much for the advancement of the church in America.

Morris, ROBERT, signer of the Declaration of Independence, was born in England in 1734. In 1775 he

was delegate to the Continental Congress. He became notable as the chief financial support of the army during the later years of the Revolution, aiding it to the full extent of his credit. He organized the Bank of North America, at Philadelphia, in 1781, the first bank of the United States, submitted a plan for a mint, which Congress approved, and was for several years superintendent of finance; in 1787 he was a member of the Convention that framed the United States Constitution; afterwards member of the first United States Senate. He was offered the post of Secretary of the Treasury, which he declined. He became bankrupt through unfortunate investments in his old age, and was imprisoned for debt. He died in 1806.

Morris, WILLIAM, an English poet, art writer and socialist, was born in 1834; died in 1896. He engaged in the designing and manufacture of high-class furniture and decorations for house interiors and had a material effect in improving the style of design employed for decorative textiles, wall-papers, etc. Morris published an epic poem, *The Life and Death of Jason*, in 1867, *The Earthly Paradise*, in 1868-71, *Love is Enough*, in 1883, *Sigurd the Volsung*, in 1876, etc. He translated various Icelandic sagas, Virgil's *Æneid* and Homer's *Odyssey*.

Morris Banks, banks organized according to the plan of Arthur J. Morris, of Norfolk, Virginia, after careful study of similar banks in Europe. Loans are made on the security of promissory notes signed by the borrower and indorsed by two friends who know his character and earning capacity.

Morris-dance (that is, *Moorish-dance*), a rustic dance supposed to have been derived from the Moors in Spain, formerly danced at village festivals, May-games, etc., in England. Bells were fastened to the feet of the performers, which jingled in time with the music, while the dancers clashed their staves or swords. In the reigns of Henry VII and VIII it was a principal feature in the popular festivals.

Morrison (mor'is-un), ROBERT, an English missionary and Orientalist (1782-1834). Author of a Chinese grammar and dictionary, and a translation of the Bible in Chinese.

Morristown (mor'is-toun), a town, county seat of Hamblin Co., Tenn., 40 miles N. E. of Knoxville, on Southern Railway. Has flour, lumber, knitting mills, etc. Pop. (1920) 5871.

Morristown, a town, county seat of Morris Co., New Jersey, 25 miles N. W. of New York. It is a popular residential place for citizens of New York. During the Revolutionary war it was twice the headquarters of the American army. The house occupied by General Washington has been purchased by the State Historical Society, and contains a collection of interesting relics. Pop. (1920) 12,548.

Morse (môrs) SAMUEL FINLEY BREESE, inventor of the electro-magnetic telegraph in its first practicable form, was born at Charlestown, Massachusetts, in 1791; died at New York in 1872. He was educated at Yale College, where he devoted special attention to chemistry and natural philosophy; but in 1811 went to England to study painting under West. In 1813 he was awarded the gold medal of the Royal Academy for his model of the *Dying Hercules*. Returning to the United States in 1815, he continued painting, and in 1826 succeeded in establishing

Samuel F. B. Morse.

in New York the 'National Academy of Design,' of which he was first president. In 1829 he went to Europe for three years, and during the return voyage worked out roughly a plan for employing electro-magnetism in telegraphy. It was not until 1835, however, that he was able to exhibit an instrument that was found to work well. By July, 1837, this instrument was perfected, and ultimately in 1843 Congress granted him means to construct an experimental line between Washington and Baltimore. This proved successful and as a result the Morse system of telegraphy has come into general use in America and Europe. In 1857 the representatives of ten countries met at Paris, and voted him 400,000 francs.

Morse's Telegraph. See *Telegraph*

Morshansk (mår-shânsk'), a town of Central Russia, govern-

ment of Tambov, a great center of trade. Pop. 27,756.

Mortality (mor-tal'i-ti), LAW OF, the statement of the average proportion of the number of persons who die in any assigned period of life or interval of age, out of a given number who enter upon the same interval, and consequently the proportion of those who survive. Tables showing how many out of a certain number of infants, or persons of a given age, will die successively in each year till the whole become extinct, are generally called the tables of mortality. In England the bills of mortality, or abstracts from parish registers, were long the only means of arriving at these results; but being found very imperfect and unsatisfactory, they were supplanted in 1836 by a general registration. The registers, if kept with accuracy and minuteness, enable us to determine the proportion of deaths, not only at different ages and in different regions, but at different seasons, in persons of different occupations and habits, in towns, or the country; and thus afford valuable materials for the science of political economy. The average rate of mortality is affected by regular or constant causes, such as race, climate, age, sex, profession, social position, density of population, political institutions, habits, etc., and by such irregular or occasional causes as war, famine, pestilence, etc., but notwithstanding the interruption of these occasional causes a constant tendency to a mean has been found to exist in any given state of society. The tendency of a population to increase depends rather on the facility of procuring the means of subsistence than on the rate of mortality.

Mortar (mor'tär), a mixture of sand with slaked lime and water, used as a cement for uniting stones and bricks in walls. The proportions vary from 1½ part of sand and 1 part of lime to 4 or 5 parts sand and 1 of lime. When exposed to the action of the air this mixture absorbs carbon dioxide and 'sets,' forming a hard, compact mass. *Hydraulic mortars*, which harden under water, and are used for piers, submerged walls, etc., are formed from so-called *hydraulic lime*, containing considerable portions of silicia and alumina. See also *Cement*.

Mortar is a kind of short cannon, of a large bore, with a chamber, used especially for throwing shells. The fire from mortars is what is termed vertical fire, the mortar being directed at a high angle and the shell striking the ground nearly vertically. The principal recommendations of vertical fire are, that the shells search behind cover and produce a great moral effect. During the European war mortars of calibers from 3-in. to 16-in. were used in the field. See *Artillery, Cannon, Howitzer*.

Mortgage (mor'gaj), in law, the conveyance of an estate, real or personal, by a debtor to his creditor, as a pledge or security for a debt. The debtor is called the mortgagor, the creditor mortgagee. The conveyance is absolute in form, but subject to a proviso by which it is to become void, or by which the pledge is to be reconveyed upon repayment to the grantee of the principal sum secured with interest, on a certain fixed day. Upon the non-performance of this condition the mortgagee's estate becomes absolute at law, but remains redeemable in equity during a limited period. In general, every description of property and every kind of interest in which it is capable of absolute sale, may be the subject of a legal mortgage. A mortgagee is not allowed to obtain any advantage out of the security beyond his principal and interest. Though the mortgagee, after the mortgagor's default in payment of the principal sum and interest has the absolute legal estate, he is still considered in equity to hold only as security for his debt. In order to obtain absolute possession of the estate, the mortgagee has to file a bill of foreclosure against the mortgagor, calling upon the latter to redeem his estate, forthwith, by payment of the principal money, interest and costs; and if he fail to do so within the time specified by the court he is forever barred and foreclosed of his equity of redemption, and the mortgagee becomes owner in equity, as he before was in law. In the event of a sale any surplus must be paid to the mortgagor.

Mortification (mor-ti-fi-kā'shun), in medicine is the death of a part of the body, while the rest continues to live, and often in a sound state. Mortification is a popular term, the scientific term being *gangrene* or *necrosis*, the former usually applied to the death of soft parts, the latter to the death of bone. Mortification is generally induced by inflammation, by exposure to freezing cold, by hospital fevers, by languid, or impeded, or stopped circulation, as in cases of bedridden or palsied persons, and by improper food, particularly the spurred rye.

Mortmain (mort'mān; Fr. *mort*, dead, *main*, hand), in law, possession of lands or tenements in dead hands, or hands that cannot alienate, as those of a corporation. *Alienation in mortmain* is an alienation of lands or tenements to any corporation, sole or aggregate, ecclesiastical or temporal, partic-

ularly to religious houses. Such conveyances were forbidden by Magna Charta.

Morton (mor'tun), Levi Parsons, vice-president of the United States (1824-1920), born in Shoreham, Vermont. In 1878 he was elected to Congress from New York; reëlected in 1880; and from 1881 to 1885 was minister to France. He served as vice-president with President Harrison, 1889-93, and was governor of New York, 1895-96.

Morton, Oliver Perry, an American statesman, born in 1823 in Wayne County, Indiana; died in 1877. He was governor of Indiana, 1861–67: United States senator (Republican) from Indiana, 1867–77; and a member of the Electoral Commission in 1877.

Morton, Thomas, an English colonist, born in England about 1590; died at Agamenticus, Maine, about 1645. He was a leader in the colony at Mount Wollaston (Braintree), Massachusetts; but was twice sent back to England for unpuritanical conduct. He finally returned to Massachusetts in 1643 and was imprisoned for his 'scandalous' book, *The New English Canaan*, published in 1632.

Morton, Samuel George, naturalist, was born at Philadelphia, Pennsylvania, in 1799; died in 1851. He studied medicine in Philadelphia and Edinburgh, in 1839 was appointed professor of anatomy in the Pennsylvania Medical College. His great works are *Crania Americana* and *Crania Egyptica*. He was among the leading students of craniography and donated a large collection of human skulls to the Academy of Natural Sciences of Philadelphia.

Morton, William Thomas Green, dental surgeon, born at Charlton, Massachusetts, in 1819; died in 1868. While practicing in Boston, he discovered the method of producing anæsthesia with sulphuric ether.

Mosaic (mō-zā'ik), a term applied to a kind of inlaid work formed by an assemblage of little pieces of enamel, glass, marble, precious stones, etc., of various colors, cut, and disposed on a ground of cement in such a manner as to form designs, and to imitate the colors and gradations of painting. This kind of work was used in ancient times both for pavements and wall decoration, while in modern times paintings are by this means copied, and the art is also used in pavements, jewelry, etc. The most remarkable modern works of this kind have been executed by Roman, Venetian and Russian artists, those of the Roman school being the most celebrated, and consisting in particular of copies of notable paintings by the great artists, such as Raffaele, Domenichino, Guido, etc. For the production of these works rods of opaque colored glass are employed, an immense variety of colors and shades being used. Pieces are cut from the ends of these rods, according to the color required, and are arranged side by side, their lower ends being attached by the cement while their upper ends show the design. From such works, when on a small scale, sections may be cut across, each section exhibiting the pattern.

Mosaic Wool-Work, rugs, etc., made of variously-colored woolen threads arranged so that the ends show a pattern. The threads are held firmly in a frame, so as to form a dense mass, with the upper ends of the threads presenting a close surface; this surface is smeared with a cement, and has a backing of canvas attached, after which a transverse section is cut the desired thickness of the pile, and so on with a number of similar sections.

Mosasaurus (mō-za-sa'rus), a gigantic extinct marine lizard occurring in the calcareous freestone which forms the most recent deposit of the Cretaceous formation. This reptile was about 25 feet long, and possessed a

Skull of *Mosasaurus Hofmanni*.

tail of a construction that must have rendered it a powerful oar.

Mosby John S., an American soldier, born in Virginia in 1833; died 1916. One of the ablest Confederate raiders in the Civil War.

Moscheles (mō'she-les), Ignaz, a pianist and composer, born at Prague in 1794, his father being a Jewish merchant. He was a professor of music at the Royal Academy, London, in 1821–46. Mendelssohn in Berlin and Thalberg in London were among his pupils, and at Mendelssohn's request Moscheles gave up his London professorship and took a similar post at Leipzig, retaining it till his death, in 1870. Among his finest compositions may be mentioned his *Concertos* Nos. 3, 4 and 5; the *Concertos Fantastique and Pathétique;* his *Sestett and Trio; his Sonatas Caractéristique and Mélancolique;* and his studies

Moschidæ (mos'ki-dē), the musk-deer family of animals. See *Musk-deer.*

Moschus (mos'kus), a Greek pastoral poet, a native of Syracuse. The time when he flourished is not accurately known, some making him a pupil of Bion, who is supposed to have lived under Ptolemy Philadelphus (third century B.C.), while others suppose him a contemporary of Ptolemy Philomētor (B.C. 100). Four idyls form the whole of the remains of Moschus, of which the most beautiful is the lament for Bion.

Mosby, JOHN SINGLETON, soldier, born in Powhatan County, Virginia, in 1833; died May 30, 1916. During the Civil war he entered the Confederate service and became leader of an independent company of raiders who did very efficient work in Virginia in destroying supply trains, capturing outposts, etc. He was of great service to Lee in scouting and raiding work and escaped all efforts to capture him. After the war he engaged in legal practice, and was consul at Hong-Kong, 1875–85.

Moscow (mos'kō; Russian, *Moskva*), the second capital (in former times the only capital) of Russia. It is the chief town of the government of the same name, and it is situated in a highly cultivated district on the Moscva; about four hundred miles southeast of Petrograd, with which it is in direct communication by rail. It is surrounded by a wall or earthen rampart 26 miles in circuit and of no defensive value; and a considerable portion of the enclosed space is unoccupied by buildings. The quarter known as the Kreml or Kremlin, on a height about 100 feet above the river, forms the center of the town, and contains the principal buildings. It is enclosed by a high stone wall, and contains the old palace of the czars and several other palaces; the cathedral of the Assumption, founded in 1326, rebuilt in 1472; the church of the Annunciation, where the emperors were recrowned; the cathedral of St. Michael; the Palace of Arms, an immense building occupied by the senate, the treasury and the arsenal; and the Tower of Ivan Veliki (209 feet), surmounted by a gilded dome and having at its foot the great Czar Kolokol, or king of bells, 60 feet round the rim, 19 feet high, and weighing upwards of 192 tons, the largest in the world. Outside the Kreml the chief building is the cathedral of St. Vassili, with no less than twenty gilded and painted domes and towers, all of different shapes and sizes. Among the principal educational establishments are the Imperial University, founded in 1755 by the Empress Catharine. It has a rich museum and a library of 200,000 volumes, and is the most important of the Russian universities. Moscow is the first manufacturing city in the empire, and of late years its industrial and commercial activity has greatly increased. The principal manufactures are textile fabrics, chiefly woolen, cotton and silk, besides hats, hardware, leather, chemical products, beer and spirits. From its central position Moscow is the great entrepôt for the internal commerce of the empire. The foundation of the city dates from 1147.

Church of Vassili Blanskenoy, Moscow.

It became the capital of Muscovy, and afterwards of the whole of the Russian empire; but was deprived of this honor in 1703, when St. Petersburg (Petrograd) was founded. The principal event in the history of Moscow is its occupation by Napoleon's army in 1812 and the burning of it for the purpose of dislodging the French from their winter quarters. Following the overthrow of the monarchy and the establishing of the republic in 1917, during the European war, Moscow, than which there is no city more characteristically Russian, became the unofficial capital, and it was here that the Soviet met on March 14, 1918, to ratify a peace treaty with the Central Powers. (See *Russia.*) Pop. (1913) 1,635,000. The government of Moscow forms an undulating tract of about 12,855 square miles. Pop. 3,303,400.

Moselle (mo-zel'), a river which rises in France, in the Vosges mountains, and flows past Metz into the Rhine at Coblentz; total length 314 miles.

Moselle (mō-zel), formerly a department of France; area, 2034 square miles. The southeastern and major part was ceded to Germany in 1871; the remainder, united to Meurthe, forms the new department of Meurthe-et-Moselle (which see).

Moses (mō'ses), leader, prophet, and legislator of the Israelites, was born in Egypt about 1600 B.C., during the time of the oppression of the Hebrews. His history, as given in the Hebrew scriptures, is as follows: His father, Amram, and mother, Jochebed, both of the race of Levi, were obliged to expose him in obedience to a royal edict, but placed him in a basket of bulrushes on the river border, where he was found by the daughter of the Egyptian king as she went to bathe. She adopted him as her son, and it is believed that she had him educated for the duties of the priesthood, the means of instruction thus afforded him being the best which his time possessed. His expedition into Ethiopia, in his fortieth year, as leader of the Egyptians, when he subdued the city of Saba (Meroe), won the affections of the conquered Princess Tharbis, and married her, rests only on a tradition preserved by Josephus. An outrage committed by an Egyptian on a Hebrew excited his anger, and he secretly slew the Egyptian. The deed became known, and he escaped the vengeance of the king only by a hasty flight into Arabia. Here he took refuge with Jethro, a Midianitish prince and a priest, and espoused his daughter Zipporah. The promises of God that his race would become a great nation occupied much of his thoughts, and at last God appointed him the chosen deliverer from the bondage in Egypt. Being slow of speech, and possessing none of the arts of an orator, God gave him power to prove his mission by miracles, and joined to him his elder brother Aaron, a man of little energy, but of considerable eloquence. Thus prepared, Moses returned to Egypt at the age of eighty years to undertake the work. At first he had the greatest obstacles to overcome, but after the visitation of ten destructive plagues upon the land, Pharaoh suffered the Hebrews to depart. Moses conveyed them safely through the Red Sea, in which Pharaoh, who pursued them, was drowned with his army. New difficulties arose, however. The distress of the people in the desert, the conflicts with hostile races, the jealousies of the elders, often endangered his authority and even his life, despite the miraculous attestations of his mission. During the term of the encampment at Sinai he received the Ten Commandments and the laws for the regulation of the lives of the Israelites. When they were already near the end of their journey towards Canaan Moses saw himself compelled, in consequence of new evidences of discontent, to lead them back into the desert, for forty years more of toilsome wandering. He was not himself permitted, however, to see the Israelites settled in their new country, on account of a murmur which, in the midst of his distress, he allowed to escape against his God. After appointing Joshua to be the leader of the Hebrews he ascended a mountain beyond Jordan, from which he surveyed the land of promise, and so ended his life in his 120th year. All superstitious reverence for his bones or his place of sepulture was prevented by the secrecy of his burial, and its effectual concealment from the people. See *Pentateuch*.

Mosheim (mos'hīm), JOHANN LORENZ VON, a German theologian, born at Lübeck in 1694, studied at Kiel. In 1723 he became professor of theology at Helmstädt. In 1747 he was appointed professor and chancellor of the University of Göttingen, where he remained till his death in 1755. Mosheim was the father of ecclesiastical history. His principal work on this subject is the *Institutiones Historiæ Ecclesiasticæ* (1755), afterwards published under various other forms, and translated into German and English.

Moskwa, BATTLE OF THE. See *Borodino*.

Moslem (mos'lem; Arabic, *muslim*, a true believer; plural, *muslimin*, hence the corrupt form, *mussulman*), a general appellation in European languages for all who profess Mohammedanism.

Mosque (mosk), a Mohammedan church or house of prayer. These buildings are constructed in the Saracenic style of architecture, and often astonish by their extent and the grandeur and height of their cupolas or domes. In these Mohammedan places of worship we find neither altars, paintings, nor images, but a great quantity of lamps of various kinds, arabesques which form the principal interior ornament, and sentences from the Koran written on the walls. Every mosque has its minaret or minarets (which see). The buildings are often quadrangular in plan, with an open interior court, where are fountains for ablutions. The floor is generally covered with carpets, but there are no seats. In the direction towards Mecca is the *Mihrab*, a recess in the wall to direct the worshipers where to turn their eyes in prayer and near this is the *mimbar* or

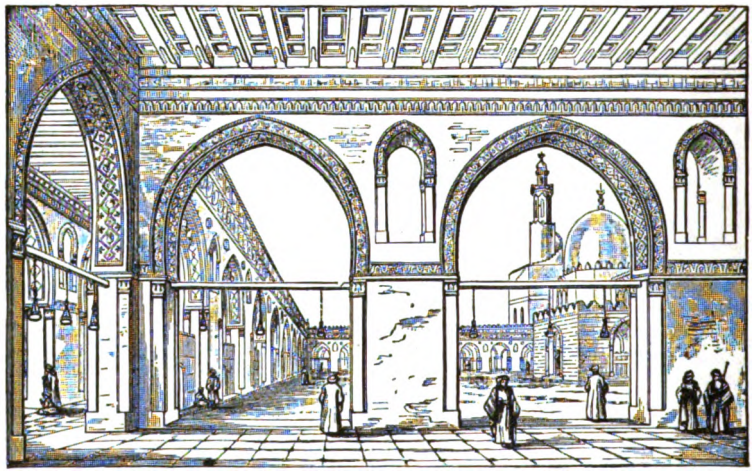
pulpit. The buildings may embrace accommodation for educational purposes, etc., besides the temple proper.

Mosquito (mus-kē'to), a general name for such insects of the gnat family as inflict a severe bite and make themselves a pest to people residing in warm climates, or during the warm season in many arctic regions. As a protection for sleepers close curtains of gauze (mosquito nets or curtains) are used; and the skin is also rubbed with various preparations to prevent their bites, and fires are lighted to drive them off. It has been discovered within recent years that mosquitoes are not alone a pest, but a serious danger to mankind, as conveyors of the germs of several diseases, especially yellow fever and malaria. As the mosquito infects man with those diseases the diseased man infects other mosquitoes, and thus the maladies are spread. By screening the windows of hospitals and sleeping rooms Havana was freed from yellow fever during the American occupation in 1898 and the Panama Canal district was likewise freed from this fatal malady. In like manner malaria has been prevented in the Roman Campagna and other places. The discovery is one of extreme importance and has led to the study of other insects suspected of germ-bearing habits or properties. See *Malaria* and *Yellow Fever*. See *Gnat*.

Mosquito Territory (mus-kē'tō), a region of Central America, lying on the Caribbean Sea, and forming the eastern seaboard of Nicaragua. For a considerable period it was governed by a native chief, and was under British protection, but in 1860 it was made over to the State of Nicaragua. The capital is called Bluefields.

Moss-agate. See *Mocha-stone*.

Moss (mos), the name given to a group of cryptogamic or flowerless plants of considerable extent, and of great interest on account of their very singular structure. They are in all cases of small size, seldom reaching a foot in height, but having a distinct axis of vegetation, or stem covered with leaves; and are propagated by means of reproductive apparatus of a peculiar nature. They are formed entirely of cellular tissue, which in the stem is lengthened into tubes. Their reproductive organs are of two kinds—axillar cylindrical or fusiform bodies, containing minute roundish particles; and thecæ or capsules, supported upon a stalk or *seta*, covered with a *calyptra*, closed by an *operculum* or lid, within which is a *peristome* composed of slender processes named *teeth*, and having a central axis or *columella*, the space between which and the walls of the theca is filled with minute *sporules*. Masses are found in cool, airy, and moist situations, in woods, upon the trunks of trees, on old walls, on the roofs of houses, etc. The genera of mosses, which are



Court of the Mosque of Tooloon, Cairo.

numerous, are principally characterized by peculiarities in the peristome, or by modifications of the calyptra, and of the position of the *urn*, or hollow in which the spores are lodged.

Mostar (mos-tär'), the capital of Herzegovina. It lies on both sides of the Narenta, in a plain about 6 miles long by 2½ miles broad; is walled, and has a vizier's palace, a number of mosques, and two extensive well-supplied bazaars. It carries on a considerable trade. Pop. 14,500.

Mosul (mō-sōl'), a town of Asiatic Turkey, 220 miles northwest of Bagdad, on the right bank of the Tigris, opposite the remains of the ancient Nineveh, where there is a bridge of boats. The houses are mostly built of sun-dried bricks, and besides numerous mosques, there are churches of the Nestorians, Jacobites, and other Christians. It has a transit trade between Bagdad, Syria, Kurdistan and Constantinople. Its principal manufactures are cotton stuffs. It was formerly celebrated also for its muslins (hence the name *muslin*). Pop. estimated at 75,000.

Motacilla (mot'a-sil-a), a genus of passerine birds including the wagtails.

Motazilites (mo-taz'il-Itz), a numerous and powerful sect of Mohammedan heretics, who to a great extent denied predestination, holding that man's actions were entirely within the control of his own will. They maintained also that before the Koran had been revealed man had already come to conclusions regarding right and wrong, and held extremely heretical opinions with reference to the quality or attributes of Deity. They appeared a few generations after Mohammed, and became the most important and dangerous sect of heretics in Islam.

Motet (mō-tet'), in music, a name applied to two different forms of composition: (1) a sacred cantata, consisting of a number of unconnected movements, as solos, duets, trios, quartets, choruses, fugues, etc. (2) A choral composition, usually of a sacred character, beginning with an introductory song, followed by several fugal subjects, the whole ending with the exposition of the last subject, a repetition of the introduction, or a special final subject.

Moth, the popular name of a numerous and beautiful division of lepidopterous insects, readily distinguished from butterflies by their antennæ tapering to a point instead of terminating in a knob, by their wings being horizontal when resting, and by their being seldom seen on the wing except in the evening or at night (though some moths fly by day); hence the terms crepuscular and nocturnal lepidoptera applied to them. Among the more notable of the moths are the 'feather' or 'plume-moths,' the death's-head moth, the 'clothes-moths,' and the 'silk-moth' (*Bombyx mori*).

Mother Carey's Chicken, the sailors' name for the stormy petrel. See *Petrel.*

Mother-of-pearl, or Nacre, the hard silvery brilliant internal or nacreous layer of several kinds of shells, particularly of the oyster family, often variegated with changing purple and azure colors. It is destitute of coloring matter, but is composed of a series of minute and slightly imbricated layers or ridges which have the power of decomposing the rays of light, thus producing beautiful iridescent hues. The large oysters of the tropical seas alone secrete this coat of sufficient thickness to render their shells available for the purposes of manufacture. Mother-of-pearl is extensively used in the arts.

Mothers' Pensions. See *Pensions, Mothers'.*

Mother's Day In 1913, by a resolution of Congress, the observance of a day under this title was instituted, the President issuing a proclamation for the first National Mother's Day in May, 1914, and fixing the second Sunday in May for its annual date. Its object was the well-being and honor of the home, its observance demanding some act of kindness, gift or tribute in remembrance of the mother—and father also—to whom grateful attention is due. An International Mother's Day Association was later organized.

Motherwell (muth'er-wel), a town in Scotland, county of Lanark, 12 miles southeast of Glasgow. The inhabitants are chiefly employed in its extensive coal mines, iron and steel works, foundries and engineering shops. Pop. (1911) 40,380.

Motherwell, William, a Scottish poet and antiquary, born at Glasgow in 1797; died in 1835. Educated at Edinburgh and Paisley, at the age of fifteen he was apprenticed to the sheriff-clerk of the latter town, and became sheriff-depute in 1819. It was while in this situation that he did his best work both as poet and ballad-collector. After editing the collection of songs called the *Harp of Renfrewshire* (published in 1819), he compiled the more important collection of ballads published in

1827, under the title of *Minstrelsy: Ancient and Modern*, with a historical introduction and notes. In 1828 he became editor first of the *Paisley Advertiser*, and then (1830) of the *Glasgow Courier*. He published in 1832 a collection of his own poems.

Motherwort (muth'er-wort; *Leonūrus cardiăca*), a labiate plant, 3 feet high, flowers in crowded whorls, white with a reddish tinge, found in some parts of Europe and North America.

Motion (mō'shun), in physical science, is the passing of a given body from one place to another. We have no idea of absolute position in space, so that when we speak of the motion of a point it is only in relation to some point regarded as fixed. Thus our conception of the movement of the earth is derived from its relation in position to the sun and stars. Bodies move in various directions, their motion being described as *rectilinear* when they move in a straight line, *curvilinear* when they move in a curve, *vibratory* when they move to and fro in relation to a fixed point, *rotatory* when they turn on an axis, and *circular* when they sweep round a given point. For Newton's laws of motion see *Dynamics*.

Motley (mot'li), JOHN LOTHROP, historian and diplomatist, born at Dorchester, Massachusetts, in 1814; died in 1877. He was educated at Harvard University and at Göttingen in Germany; published two novels called *Morton's Hope* (1839) and *Merry Mount* (1849), both of which were unsuccessful; contributed to the *North American Review;* and entered political life as a member of the Massachusetts House of Representatives. He published, after ten years' labor and a journey to Europe, his great *History of the Rise of the Dutch Republic* in 1856, a work which was further developed in the *History of the United Netherlands* (1860-65): and the *Life and Death of John Barneveld* (1874). He was ambassador from the United States to Vienna in 1861-67, and to London in 1869-70. His correspondence, in 2 vols., edited by Geo. W. Curtis, has been published (1889).

Mot-mot, a beautiful South American fissirostral bird of the genus *Momotus* or *Prionites*, about the size of a jay.

Motor (mō'tur), a machine for transforming natural energy in various forms into mechanical work. See *Electro-Motors*, etc.

Motor Boat, the term applied to a boat moved by a gasoline or other small engine. (See *Gas Engine.*) The application of the internal-combustion engine to small boats dates back to about 1890. See also *Hydroplane.*

Motor-car. See *Automobile.*

Motor Cycle, a form of bicycle in which a gasoline engine, occupying the space between the wheels, is the means of propulsion. The earliest designs were one-cylindered, but two-cylinder machines are now extensively used, and some makers are building them with four cylinders. The motor cycle has all the features of operation and control that belong to the gasoline-driven automobile (*q. v.*), including gasoline tank, oil tank, carburetor, magneto, clutch, throttle, spark-advance control, muffler and so forth. The latest motors are of the four-cycle type, producing a power stroke in each cylinder once in every two revolutions of the flywheels. The four cycles or strokes of piston travel are as follows: intake, compression, explosion and exhaust. With two cylinders there is a power stroke for every revolution of the flywheels. Change-speed transmissions are provided, giving two or three different speed ratios between motor and rear wheel. The engine is started by means of a kick-starter or by pedalling. A side car or a delivery wagon may be added.

Motor-generator Set, an alternating current motor coupled to a direct current generator. It is often used in arc lighting and in supplying three-wire direct current systems from alternating mains.

Mott, LUCRETIA (COFFIN), reformer, was born in Nantucket, Massachusetts, in 1793; died in 1880. She married James Mott, like herself interested in the anti-slavery cause. She joined the Friends in 1818. In addition to her advocacy of anti-slavery, she was an able advocate of equal suffrage.

Mott, VALENTINE, surgeon, was born at Glen Cove, Long Island, in 1785. He studied in London and Edinburgh. In 1811 he was professor of surgery in Columbia College; afterwards in other colleges. Dr. Mott gained world-wide reputation for boldness and originality as a surgeon. He died in 1865.

Moufflon, MOUFLON (mō'flon), the *Ovis*, or *Caprovis. Musimon*, a wild animal of the sheep kind, inhabiting the mountainous parts of Corsica, Sardinia, and Greece. It is about the size of a small fallow-deer, and although covered with hair instead of wool, bears a stronger resemblance to the ram than to any other animal, both in regard to its horns and its general conformation.

Moukden. See *Mukden.*

Mould (mōld), a minute fungoid or other vegetable growth of a low type, especially one of such vegetable organisms as appear on articles of food when they are left neglected, on decaying matters, bodies which lie long in warm and damp air, animal and vegetable tissues, etc.

Mouldings (mōld'ingz), in architecture, a general term applied to the varieties of outline or contour given to the surfaces or edges of various subordinate parts or features of buildings, whether projections or cavities, such as cornices, bases, door or window jambs, lintels, etc.

Moulins (mö-lan), a town of France, capital of the department of Allier, on the river of that name, 164 miles S. S. E. of Paris. It has among its edifices a cathedral, a college, an old castle, and its chief manufactures are cutlery, hosiery, ivory articles, etc. Pop. (1911) 21,991.

Moulmein (mōl-mīn'), or MAULMAIN (mal-mān'), a seaport of Burmah, division of Tenasserim, at the mouth of the river Salween. It has a good harbor, and a considerable trade chiefly in teak, cotton, rice, tobacco, stick-lac, lead, copper, cocoanuts, hides and live stock. Pop. 58,346.

Moult (mōlt), the process of shedding or casting feathers, hair, skin, horns, etc. The word is most commonly used with regard to birds; but other animals, such as crabs and lobsters, which shed their entire shells, frogs and serpents, which cast their skins, and deer, which shed their horns, also moult.

Moultrie (mōl'tri), WILLIAM (1731–1805), an American Revolutionary soldier, son of a Scotch Physician who settled in South Carolina in 1733. He became a captain of militia and in 1761 fought against the Cherokee Indians. In the popular movements preceding the revolution he took a prominent part and was a delegate from St. Helena Parish to the South Carolina provincial congress. He was made a colonel the same year, and for the defense of Charleston placed a battery at Haddrell's Point, driving off two blockading vessels. The fleet of Sir Peter Parker and Sir Henry Clinton threatened Charleston, and Colonel Moultrie constructed a fort of palmetto logs on Sullivan's Island. On June 28, 1776, the fort was fiercely bombarded, but the projectiles sank harmlessly into the soft palmetto logs, and Moultrie, though poorly supplied with ammunition, was able to defeat the British, who had a casualty list of 225, the American loss being but 35 men. The fort was afterward called Fort Moultrie.

Moultrie, county seat of Colquitt Co., Georgia, 140 miles S. of Macon, on 4 railroads. It has 25 industrial plants including cotton mill and packing plant. Pop. (1920) 6789.

Mound Birds (*Megapodidæ*), a family of gallinaceous birds, remarkable for the large mounds which they build as incubators for their eggs. They are natives of the islands of the Pacific. The Australian species (*M. tumulus*) is about the size of the common fowl, and builds mounds of vegetable refuse, leaves, and soil, adding to them yearly till they become of great size. The largest on record measured 150 feet in circumference. The eggs are laid in separate holes in the mound, at a depth of 5 or 6 feet, and left to be hatched by the warmth of the decomposing vegetable matter. In a related genus (*Leipoa*) the eggs are laid separately in a circle in the center of the mound and deeply covered with compost. In the genus *Lallegalbus* the mounds are used socially by a number of birds.

Mound Builders, the name given to the Indians who formerly inhabited the Ohio and Mississippi valleys, and have left some very remarkable earthworks as their only memorials. The best known group of mounds is near Newark, Ohio, and consists of elaborate earthworks, in the form of a circle, octagon and square, enclosing an area of about 4 square miles, on the upper terrace between two branches of the Licking River. In addition, the neighboring hills are crowned with tumuli or mounds, apparently erected by the same people and containing human remains. Similar mounds are found in many parts of the Mississippi Valley States, some of them seeming to have been erected for purposes of defense, others for burial, and some very large ones for religious purposes. One, of considerable length, is in the form of a snake, with what seems intended for an egg in its mouth. Others resemble quadrupeds, a trunked animal, like the elephant, being among them. The Mound Builders were formerly supposed to be an anterior, semicivilized race, but it is now believed that they were the ancestors of the present Indians, as some of the Gulf State Indians have built mounds within historic times.

Moundsville, a city of West Virginia, capital of Marshall Co., on the Ohio River, 12 miles below Wheeling. It is in a coal-mining district, and has glass and brick works,

stove, cigar and whip factories. It is named from a remarkable artificial mound nearly 75 feet high, of prehistoric Indian erection. Pop. (1910) 8918; (1920) 10,669.

Mountain (moun'tin), a mass of earth and rock rising above the surface of the globe higher than a hill. Mountains are usually found in groups, systems, ranges, or chains, though isolated mountains, due to volcanic action, are also found. The elevation of great mountain masses is due to gigantic subterranean movements long continued; but mountains of considerable mass have also been carved out by surface denudation. The highest mountain in the world, so far as known, is Mount Everest, one of the Himalayan range, 29,002 feet.

Mountain, The. See *Montagnards.*

Mountain-ash. See *Rowan-tree.*

Mountain-cork, a white or gray variety of asbestos, so-called from its extreme lightness, as it floats in water.

Mount Carmel, a city, county seat of Wabash Co., Illinois, on Wabash River, 35 miles N. W. of Evansville, Ind., on the Big Four and Southern R. Rs. It has railroad shops, flour and lumber mills, and other industries. Pop. (1920) 7456.

Mount Carmel, a borough of Northumberland Co., Pennsylvania, 71 miles N. E. of Harrisburg, on the Lehigh Valley, Pennsylvania and Reading R. Rs. The chief industry is coal mining; also mine machinery and mine supplies. It has several cigar factories; and shirt, stocking and silk mills. Pop. (1910) 17,532; (1920) 17,469.

Mount Clemens, county seat of Macomb Co., Michigan, on the Clinton River, at the head of navigation, 20 miles N. E. of Detroit, on Grand Trunk R. R. It is a health resort, with curative mineral springs; also has manufactures of candy, motor trucks, automobile parts, semi-porcelain dinner ware, etc. Pop. 9488.

Mount Desert, a mountainous island in the Atlantic, belonging to Hancock Co., Maine, off the coast; was settled by the French in 1608. It is 14 miles long and 7 miles wide. It is a favorite place of summer resort.

Mount Holly, county seat of Burlington Co., New Jersey, 20 miles E. of Philadelphia, on Pennsylvania R. R. Here is the Burlington County Lyceum of History and Natural Science, founded 1876. It has shoe, hosiery and other factories. Pop. 5901.

Mount Holyoke College (hōl'yok), a college for women at South Hadley, Mass., founded by Mary Lyon in 1837 as Mt. Holyoke Seminary; chartered under present name in 1888. It has about 800 students.

Mount McKinley National Park, in South Central Alaska, 2200 sq. miles; created 1917. It contains Mount McKinley, the highest peak of North America, 20,464 feet.

Mount Oliver, a borough of Allegheny Co., Pa., a suburb of Pittsburgh. Pop. 5575.

Mount Pleasant, a borough of Westmoreland Co., Pennsylvania, 32 miles S. E. of Pittsburgh, on Baltimore & Ohio and Pennsylvania R. Rs. Seat of Western Pennsylvania Classical and Scientific Institute. It has glass and coke interests. Pop. (1920) 5862.

Mount Rainier National Park, in the State of Washington; 324 sq. miles; created 1899. It has a number of glaciers; also Mount Rainier (Tacoma), 14,408 feet.

Mount Stephen, a peak in the Rocky Mountains, named for Baron Mount Stephen, Canadian capitalist (1829-1921), one of the promoters and first president of the Canadian Pacific Railway.

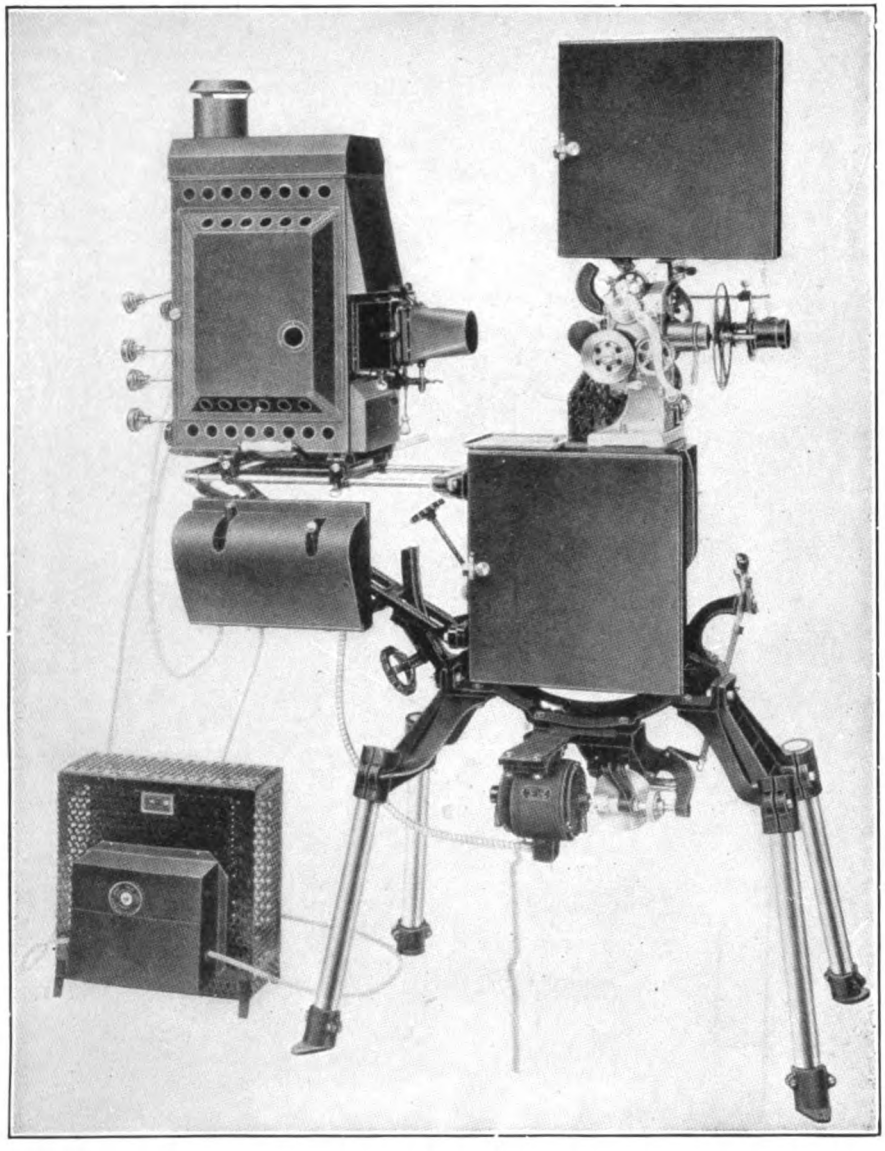
Mount Vernon, memorable as the residence of George Washington, is in Fairfax Co., Virginia, on the west bank of the Potomac, 15 miles below Washington City.

Mount Vernon, a city, county seat of Jefferson Co., Illinois, 77 miles S. E. of St. Louis, Mo., on Louisville & Nashville and other R. Rs. It has car shops and manufactures of candy, shoes, cut glass, railroad ties, freight cars, etc. Pop. (1920) 9815.

Mount Vernon, a city, county seat of Posey Co., Indiana, on the Ohio River, 20 miles below Evansville, and on the Louisville & Nashville and Chicago & Eastern railroads. It has saw and flour mills, foundry, carriage and other factories. Pop. (1920) 5284.

Mount Vernon, a residential city of Westchester Co., New York, adjoining New York on the north. Here are many beautiful homes of New Yorkers. Pop. (1920) 42,726.

Mount Vernon, a city, county seat of Knox Co., Ohio, on the Kokosing River, 45 miles N. E. of Columbus. It has foundries, and manufactures of engines, structural steel, rubber tires, etc. Pop. (1920) 9237.



MOVING PICTURE PROJECTING MACHINE

This is one of the latest types of machines for throwing moving pictures on a screen. In the upper left hand corner is the electric arc light. To the right are the boxes which hold the film reels, and between them the driving gears, revolving shutter and lens. In the lower left hand corner are the resistance coils for the motor.

Mount Washington, the highest peak in New England, is 6226 feet high. It is in the White Mountains of New Hampshire, 85 miles N. W. E. of Concord, and a favorite place of resort in the heated term of summer.

Mount Whitney, the highest mountain of the United States, outside of Alaska, a peak of the Sierra Nevadas in California, 14,501 feet.

Mourning (mōr'ning), as the outward expression of grief, has greatly varied at different times and among different nations. Thus the eastern nations and the Greeks cut off their hair, while the Romans allowed the beard and hair to grow; and as an evidence of mourning the ancient Egyptians wore yellow; the Ethiopians, gray; the Roman and Spartan women, white.

Mourning Cloak, a butterfly, called in England the Camberwell Beauty (*Vanessa Antiopa*). It is a rich velvety brown, its wings bordered with yellow and brown. It appears in the United States and Canada early in spring, after hibernating in the winter.

Mourzouk, or MURZUK (mur-zuk'), the capital of the pashalic of Fezzan, in the regency of Tripoli, situated 480 miles southeast of Tripoli. It is girt by an earthen wall, and was at one time a place of great commercial importance. Pop. about 6500.

Mouse (mous), the name of a number of rodents of which the most familiar is the domestic mouse (*Mus musculus* or *domesticus*), too well known to need description. The harvest-mouse (*Mus messorius* or *minutus*), the smallest of quadrupeds, is a hibernating mammal, and constructs a little nest of grass, etc., entwined round and supported by the stalks of the corn or wheat. The common field-mouse (*M. sylvaticus*) is of a dusky brown, with a darker strip along the middle of the back, while the tail is of a white color beneath. There are about a hundred members of the mouse genus, of which the common rat is one. The short-tailed field-mouse, or 'meadow-mouse,' is not a true mouse, but one of the voles (*Arvicola*). It is of a reddish-brown color, inclining to gray, the under parts are lighter, or ashy-brown, and the tail and feet are of a dusky-gray color. The dormouse also is of a different family from the true mice.

Mouse-ear Chickweed (*Cerastium*), a genus of plants, nat. order Caryophyllaceæ, consisting of many pubescent herbs with small leaves and white flowers, forming common weeds in all temperate and cold regions. It may be either annual or perennial.

Mousquetaires du Roi (mŏs-kĕ-târ dû rwa; 'musketeers of the king'), under the old French regime mounted companies of royal guards. They were instituted by Louis XIII, and served as a school to many distinguished French commanders.

Mouth, the aperture in the head of an animal through which food is received and voice uttered; or generally the anterior opening of the alimentary canal. In the higher animals the use of the mouth is for mastication, the emission of sound or voice, deglutition, and taste, In many animals of a low type of structure there is no distinct mouth. Thus in the simpler Protozoa the food is taken into the interior of the body by a process of intussusception, any portion of the surface being chosen for this purose, and acting as an extemporaneous mouth.

Moving Picture Machines. Two kinds of machines are employed in the taking and showing of moving pictures—motion picture cameras and motion picture projecting machines. The camera is the simpler mechanism of the two, consisting of a light proof box with separately enclosed reels for the exposed and unexposed film. At the front is the lens, back of which is the rotary shutter. The film, a long strip of transparent celluloid sensitized like a photographic plate, is lead through guides back of this shutter past the lens. The shutter interrupts the light for a brief space of time necessary to move the film into position for the next picture. Thus the motion of the film is intermittent, being stationary back of the lens for the time necessary to register the picture then, with the shutter closed, moving into position for the next picture. The motion is imparted by a hand crank on the outside of the camera through suitable grooved and toothed wheels to the perforated edges of the film. The sensitized films are made in lengths of about 1000 feet, each picture is ¾ x 1 inch in size, sixteen pictures to the foot, and has four perforations on either side for the driving sprockets.

The motion picture projecting machine consists of a powerful electric arc lamp from which the light passes through lenses, through the film which is passed before it with an intermittent motion by suitable machinery either hand or electrically operated. In front of the film is a rotary ghutter, as in the camera, which interrupts the light long enough to avoid blurring the successive impressions on the mind of the observer during the long

interval of time necessary to move the film into a new position. In front of the shutter are lenses which magnify the picture thrown on the screen to about 35,000 times the size of the film picture. The design of this machine is extremely ingenious. Above and below the projection head (which contains the machinery and lenses) are the film reels, the upper being the feed-reel and the lower the takeup-reel. Sprocket wheels control the action of the film. The top feed sprocket pulls the film from the upper reel, the middle intermittent sprocket turns in a way to give each picture a certain time of stop over the projection aperture, and the bottom takeup sprocket assists in winding the film on the takeup-reed. Modern machines have many devices for the prevention of fire in the machine, which is a considerable source of danger owing to the inflammable character of the film and the igniting power of the light if allowed to play on a motionless film. These devices consist of five shutters which automatically cut off the light while the film is at rest; film-shields which enclose the film, five valves which prevent the entrance of fire into the magazines and a fire-proof booth which encloses both machine and operator.

Moving Picture Plays. The evolution of the moving picture play or photo-play from the crude moving picture to the distinct artistic form of the present day followed much the same course as the evolution of the modern drama from the crude mimicry of early times. The period of its evolution, however, was much briefer, occupying but a few years. The early moving picture was merely a reproduction of transcripts from actual life with little attempt at artistic arrangement. Soon, however, the obvious expedient of using the moving picture to tell a story occurred to the producers and the steps to the modern drama began with farce or broad comedy of the slap-stick variety, followed by photo-dramatization of popular plays and novels until the perfected motion picture play of the present day was attained.

To reach this state of perfection it was necessary to evolve a whole new technique. In the early days of the enterprise it was thought that the methods of the stage could be applied directly to motion picture production. Gradually the possibilities and limitations of the art come to be appreciated and a new and distinct form of play evolved.

In a technical sense the moving picture play is more nearly related to pantomime than drama though differing essentially from both. In pantomime all thought is conveyed by gesture while in drama language is made to carry a large portion. In a moving picture, however, the characters seem to be speaking although they cannot be heard. Facial expressions and gestures are used as far as possible to give expression, helped out where necessary by leaders or captions, written or printed matter shown on the screen to explain an otherwise unintelligible situation. These limitations force the producers to choose plays in which action is predominant over nice shadings of character or psychological analysis. Change of scene is frequent and scenes may be arranged in any way best suited to illustrate the plot, thus giving the playwright a very flexible structure and the opportunity to employ a great deal of detail which adds to the verisimilitude and has made the moving picture play a dangerous rival to the legitimate stage.

Most of the motion-picture production is on the Pacific Coast, where there are some 40 studios in operation, employing 7500 people. Close to $100,000,000 is spent annually in the production of pictures, and it is estimated that the average film costs about $50,000. Pictures costing $100,000 and upwards are, however, not unusual. The annual output of film is over 600,000,000 feet. The investment in the moving-picture theaters of the United States is close to $1,000,000,000. Moving pictures are increasingly being used also for educational, advertising, merchandizing, and purposes other than amusement. See also *Moving Picture Machines.*

Moving Plant (*Desmodium gyrans*, nat. order *Leguminosæ*), a native of India, also called telegraph plant, with trifoliate leaves. It is remarkable for the motions of its terminal leaflets, especially under the influence of light and heat.

Mozambique (mō-zam-bēk'), a district of Portuguese East Africa, extending from Cape Delgado to Delagoa Bay, and to an uncertain distance into the interior; area estimated at about 100,000 square miles, only a small part of which is occupied. The coast is generally low, beset with reefs and small islands, but possessed of numerous good harbors. Inland there rises a broad plateau, with groups and chains of mountains running mostly parallel to the coast, and nowhere reaching a great height. The climate is excessively hot, and, except on the elevated regions, unhealthy. Most tropical fruits and cotton thrive, and the forests produce valuable woods. The prin-

cipal articles of trade are ivory and skins. The capital is the town of Mozambique, situated upon a small coral island near the coast, having a good harbor and a small trade. Pop. about 7000.

Mozambique Channel, the passage between the east coast of Africa and the island of Madagascar; length about 1050 miles, average breadth about 450 miles. In its north part lie the Comoro Islands.

Mozarabs (mo-zär'abz), a name applied by the Mohammedans in Spain to the Christians among them who retained their own religion. The Mozarabic liturgy which they used was suppressed about 1060, but was revived at the beginning of the sixteenth century in Toledo, where it is still preserved.

Mozart (mō-zärt'; German pron. mō'tsärt), JOHANN CHRYSOSTOMUS WOLFGANG AMADEUS, a great German composer, born at Salzburg in 1756; died at Vienna in 1791. At the age of four years his father, Leopold Mozart, a violinist of repute, began to teach him some minuets and other small pieces on the harpsichord. From this period he made rapid progress, and a concerto for the harpsichord, which he wrote in his fifth year, was so difficult that only the most practiced performer could play it. In his sixth year Mozart was taken by his father, along with his sister, to Munich and Vienna, where the little artists were received at court with great favor. In 1763 the family made a journey to Paris, where Mozart published his first sonatas for the harpsichord; and in the following year they proceeded to England, where the child-musician performed before the court the most difficult compositions of Bach and Handel. Returning to Salzburg after visiting Holland, the family again went to Vienna in 1767, where the boy received a commission from the emperor to write the music of a comic opera, but owing to the opposition of the court musicians the work was never performed. In 1769 Mozart, who had been made master of the concerts at the court orchestra at Salzburg, commenced a journey to Italy in company with his father. In Rome he wrote down, on hearing it, the famous *Miserere*, annually sung in the Sistine Chapel during the holy week. At Milan in 1770 he composed, in his fourteenth year, his first opera, *Mithridates*, which was performed more than twenty times in succession. Henceforth he resided chiefly in Salzburg, but also visited Paris, Munich, and finally Vienna. In the latter city, although he was appointed composer to the court, he found it necessary to maintain himself by giving lessons in music and writing waltzes Notwithstanding this poverty it was here that most of his best work, such as his famous operas, *Le Nozze di Figaro* ('The Marriage of Figaro'), *Don Giovanni*, *La Clemenza di Tito* ('Clemency of Titus), *Die Zauberflöte* ('The Magic Flute'), and his last work, the *Requiem*, were written. It was here also that the best pianist and greatest composer of his time —perhaps of the world—died in obscurity and was buried in a pauper's grave. The extent of work done by Mozart during his short life is almost incredible, and in every department of composition, whether vocal or instrumental, he excelled. In the history of music he stands most prominently forward as an operatic composer, his *Don Giovanni*, *Magic Flute* and *Marriage of Figaro* being works previously unequaled and never since surpassed. In his character he was kind-hearted, guileless, cheerful, void of envy, almost boyish to the last.

Mtzensk (m'tsensk), a town of Russia, province of Orel, 35 miles N. E. of Orel. Pop. 9390.

Mualitch'. See *Muhalitch*.

Much Woolton, a town of England, county of Lancaster, 5 miles southeast from Liverpool. There are extensive quarries in the neighborhood. Pop. 4320.

Mucilage (mū'sil-ij), a solution of some gummy substance in water, giving it a certain consistence; in chemistry, one of the proximate elements of vegetables, a carbohydrate ($C_6H_{10}O_5$, or similar formula). It is contained abundantly in gum tragacanth, many seeds, as linseed, quince seed, etc., and certain roots, as marsh-mallow. It forms a thick jelly with water, and when boiled with dilute sulphuric acid gives rise to a sugar and a gum.

Mucius Scævola (mū'si-us sev'o-la), the hero of a Roman legend to the effect that having attempted to assassinate Porsenna, King of Etruria, Mucius was ordered to be burned alive, but he won the king's favor and pardon by fearlessly holding his hand in the fire.

Mucor (mū'kur), a genus of fungi to which most of the matter constituting mold on cheese, paste, decaying fruits, and other substances is referred. The most common species is *M. mucēdo*.

Mucous Membrane (mū'kus), a membrane that lines all the cavities of the body which open externally and secretes the fluid mucus. See *Mucus*.

Mucu'na. See *Cowitch.*

Mucus (mū'kus), a viscid fluid secreted by the mucous membrane of animals, which it serves to moisten and defend. It covers the lining membranes of all the cavities which open externally, such as those of the mouth, nose, lungs, intestinal canal, urinary passages, etc. It is transparent, glutinous, thready, and of a saline taste; it contains a great deal of water, chloride of potassium and sodium, lactate of sodium and of calcium, and phosphate of calcium. Mucus forms a layer of greater or less thickness on the surface of the mucous membranes, and it is renewed with more or less rapidity. Besides keeping these membranes in a moist and flexible condition, it also protects them against the action of the air, of the aliment, the different glandular fluids, and agencies that might otherwise irritate and inflame.

Mud, in geology, a mixture of clay and sand with organic matter. Mud may be argillaceous, calcareous, or otherwise, according to the most notable ingredient which enters into its composition.

Mudar (mū'dar), the Indian name of *Calot. ?pis gigantea,* a shrub or small tree of the nat. order Asclepiadaceæ, and also given to a substance used medicinally in India with great alleged effect in cutaneous diseases, and obtained from this and another species (*C. procĕra*). The inner bark of *C. gigantea* also yields a valuable fiber.

Mud-bath, a kind of bath connected with some mineral springs, consisting of mud transfused with saline or other ingredients, in which patients suffering from rheumatism, etc., plunge the whole or portions of the body. Such are the mud-baths of St. Amand, or of Barbotan, in France.

Mud-fish. See *Dipnoi.*

Mudir (mū-dir), a Turkish official at the head of a canton or part of a liva under a kaimakam; in Egypt, the governor of a province or *mudîrîyeh.*

Mudstone (mud'stōn), a term originally applied to certain dark-gray fine-grained shales of the Silurian system, but now extended to all similar shales in whatever formation they may occur.

Muezzin (mō-ed'zin), or MUED'DIN, a Mohammedan crier attached to a mosque, whose duty it is to proclaim the *ezam* or summons to prayers five times a day—at dawn, at noon, 4 P. M., sunset, and nightfall. He makes his proclamation from the balcony of a minaret; and as this elevated position enables a person to see a good many of the private proceedings of the inmates of the neighboring houses, the post of muezzin is often entrusted to a blind man.

Muffle (muf'l), in chemistry, an arched vessel resisting the strongest fire, and made to be placed over cupels and tests in the operation of assaying.

Mufti (muf'ti), in the Turkish Empire, a religious officer who exercises the functions of an authoritative judge in matters of religion. The muftis are chosen from among the ulemas or doctors of the law, and the grand mufti or Sheikh-ul-Islam is the highest officer of the church and the representative of the sultan in spiritual matters.

Muggletonians (mug-l-tō'ni-ans), a sect that arose in England about the middle of the seventeenth century, of which the founders were John Reeve and Ludovic Muggleton, who claimed to have the spirit of prophecy. They affirmed themselves to be the 'two witnesses' of Rev. xi, 3.

Mugwump (mug'wump), a political term, coined in the United States during the Presidential campaign of 1884, and applied to the members of the Republican party who refused to support the party nominee. The word comes from the Algonquin Indian language. It is still used to designate those who are independent in politics or otherwise.

Muhalitch, or MUALITCH (mu-hă-lēch'), a town of Asiatic Turkey, about 15 miles south of the Sea of Marmora. It has a considerable trade with Constantinople. Pop. about 7000.

Muhlenberg (mū'lin-burg), HEINRICH MELCHIOR, born in Hanover in 1711. He was the organizer of the Lutheran church in the United States. He arrived in Philadelphia in 1742, to take charge of the German settlements from Nova Scotia to Georgia. He founded the first Synod in 1748. He advocated the use of the English language in the churches. Died in 1787.

Muhlenberg College, in Allentown, Pennsylvania, founded in 1867, and named in honor of Heinrich Melchior Muhlenberg. It has endowed funds amounting to $275,000.

Muhlhausen (mūl-hou'zen), a town of Saxony, Prussia, 29 miles N. W. of Erfurt. The medieval town-hall is a noteworthy edifice. It has manufactures of textiles and cigars, and dyeing, tanning and brewing are carried on. Pop. (1910) 35,083.

Mühlheim, or MÜLHEIM, a town of Germany, Rhine province, on the Ruhr, 16 miles north of Düsseldorf. Pop. (1910) 112,362.

Mühlheim, or MÜLHEIM, a town of Germany, Rhine province, 3 miles N. E. of Cologne. Pop. 53,355.

Muir (mûr), JOHN, a Sanskrit scholar, born at Glasgow in 1810; died in 1882. He was educated at the University, and joined (1828) the East India Company's Civil Service, filling various offices. His chief work was *Original Sanskrit Texts on the Origin and History of the People of India, Their Religion and Institutions,* 5 vols. (1858–70).

Muir, JOHN, an American geologist and explorer, born at Dunbar, Scotland, April 21, 1838; died December 24, 1914. He came to the United States in 1849, studied at the University of Wisconsin, 1860–64, and made extensive botanical and geological excursions. In 1876–79 he was a member of the U. S. Geodetic Survey and made several tours of exploration in the Northwest, discovering in Alaska the great glacier which bears his name. He was active for many years in the cause of forest reservations and parks, and his works include *The Mountains of California* (1894), *Our National Parks* (1901), etc.

Muir Glacier, a large glacier of Alaska, discharging into Glacier Bay, in about 58° 45′ N., and 136 5′ W. Its main trunk is 30 to 40 miles broad and is fed by numerous tributaries. At the sea it is some 2 miles wide and 100 to 200 feet high.

Mukden (mųk'den), MOUKDEN, or FUNG-TIEN-FU, a town of China, capital of Manchuria and of the province of Leao-Tong, about 380 miles N. E. of Peking. It is surrounded by a wall and has also a wall which encloses the government offices, palace, and other buildings, and it was the residence of the Manchu sovereigns before their conquest of China. Around it were fought in 1904–05 the greatest battles of the Russo-Japan war. Pop. (1915) 184,389.

Mula (mö'lä), a town of Spain, province of and 21 miles west from Murcia. The principal manufacture is earthenware. Pop. 12,731.

Mulatto (mû-lat'tō), a person that is the offspring of parents of whom one is white and the other a negro. The mulatto is of a dark color tinged with yellow, with frizzled or woolly hair, and in features resembles the European more than the African.

Mulberry (mul'bėr-i), a fruit tree of the genus *Morus,* nat. order Moraceæ, akin to the Urticaceæ or nettles. The black or common mulberry (*Morus nigra*) is the only species worthy of being cultivated as a fruit tree. The fruit is used at dessert, and also preserved in the form of a syrup. The juice of the berries forms a light wine. The tree is not originally a native of Europe, though it thrives there. The white mulberry (*M. alba*) is the most interesting of the genus, on account of its leaves being used for food by silkworms. It came originally from China. The red mulberry (*M. rubra*) has fruit of a deep-red color, and is a valuable American tree. The paper mulberry (*Broussonetia papyrifĕra*) is a distinct genus, belonging originally to Japan, and now cultivated in Europe and America. In Japan the bark is used in making paper; the islanders of the Pacific use it to make clothing.

Mule (mûl), the name applied to any animal produced by a mixture of different species, but specifically denoting the hybrid generated between an ass and a mare. The head of the mule is long and thin, its ears long, the upper part of its tail covered with short hairs, and its mane short. (See *Hinny.*) The mule unites the sagacity of the horse with the dogged perseverance of the ass, and is docile in temper when fairly treated.

Mule Deer (*Cariocus macrotis*), also called the black-tailed deer, gets its name from its large ears. Among North American deer it is next in size to the wapiti and caribou.

Mulhouse (mul'hous), German, MÜLHAUSEN, a town in the department of Haut Rhin, France, on the River Ill and the Rhine-Rhone canal, about 56 miles S. W. of Strasbourg. Its industries include the manufacture of cotton, printing and dyes, chemicals, iron and other metal works, machine shops, etc. It is one of the great textile centers of the continent. It also carries on a large trade in grain, wine and lumber. It was a free town in 1273; joined the Swiss federation in 1515; in 1797 it was incorporated with the French republic, and was ceded to Germany with Alsace-Lorraine in 1871. It was captured by the French in 1914, but relinquished. By the peace treaty of 1919 (see *Treaty*), following the defeat of Germany in the European war, it was restored to the French Republic, with Alsace-Lorraine. Pop. 95,000.

Mull, an island on the west coast of Scotland, one of the Hebrides, belonging to Argyllshire, from which it is separated by the Sound of Mull and the Firth of Lorn; length 30 miles, breadth 29 miles. The island is for the most part mountainous, the highest point being Benmore, 3185 feet above sea-level. The

land in some parts is adapted for grazing, and there are numerous fresh water lochs. The only town is Tobermory. Pop. 4334.

Mullagatawny (mul-a-ga-ta'ni), a soup which is made with fowl or meat cut into small pieces and mixed with rice, curry powder, etc.

Mullein (mul'en), the common English name for the plant *Verbascum Thapsus*, nat. order Scrophulariaceæ. The common mullein grows in old fields, roadsides, etc., and is a tall, rough plant. The flowers are yellow, almost sessile, and are disposed in a long cylindrical spike.

Müller (mül'ẽr), FRIEDRICH MAX, a celebrated philologist, son of the German poet Wilhelm Müller, was born at Dessau in 1823; entered the University of Leipzig where he studied Sanskrit under Brockhaus, and published (1844) the *Hitopadesa*, a collection of Sanskrit fables; proceeded then to Berlin, where he attended the lectures of Bopp and Schelling; continued his studies under Burnouf in Paris; went to England in 1846, and established himself at Oxford where he was appointed successively Taylorian professor of modern languages (1854), assistant, and ultimately sublibrarian at the Bodleian library (1865), and professor of comparative philology (1868), a position which he (nominally) held to his death, though he practically resigned in 1875. He was a foreign member of the French Institute, and an LL.D. of Cambridge and Edinburgh. His numerous writings include an edition of the *Rig-Veda* (6 vols. 1849-74); *History of Sanskrit Literature* (1859); *Lectures on the Science of Language* (2 series, 1861 and 1864; many editions since); *Chips from a German Workshop* (4 vols. 1868-75); *On the Origin and Growth of Religion* (1878); *Selected Essays* (2 vols. 1882); *The Science of Thought* (1887); *Biographies of Words* (1888); *Natural Religion* (1889), and he was the editor of the series of *Sacred Books of the East*. He died in 1900.

Müller, JOHANN, a German physiologist, born at Coblenz in 1801; died in 1858. He studied medicine at Bonn, first becoming (1830) professor of physiology there, and then occupying the same position at Berlin from 1833 until his death. He was the author of *Elements of Physiology* (1837) and other works.

Müller, KARL OTFRIED, a German classical scholar, born in 1797; died at Athens in 1840. He studied at Breslau and Berlin; was appointed (1817) professor of ancient languages in the former city; obtained the chair of archæology at Göttingen in 1819; visited Italy, and then Greece, where he died. His best-known works are on the Dorians and the Etruscans, and his *History of the Literature of Ancient Greece* (1840).

Müller, WILHELM, a German poet, born at Dessau in 1794; died in 1827. He studied at Berlin; volunteered in 1813 into the Prussian army, and was present at the battles of Lützen, Bautzen, Hanau and Culm; journeyed to Italy in 1819; and on his return was appointed teacher of Latin and Greek at Dessau. His chief poetical works are lyrical, and are very popular in Germany. He also published the *Library of the Seventeenth Century German Poets*. His son is the well-known Friedrich Max Müller. See above.

Müller, WILLIAM JAMES, landscape and figure painter, born in 1812 at Bristol, England, where his father, a German clergyman, was curator of the museum. He studied painting under J. B. Pyne, and first exhibited in the Royal Academy in 1833. In 1833-34 he visited Germany, Switzerland and Italy, and in 1838 Greece and Egypt; while in 1843 he accompanied, at his own expense, the Lycian expedition under Sir Charles Fellowes, bringing back many sketches and pictures of oriental life and scenery. He lived for some time in London, but returned to Bristol to die in 1845. His pictures, though not numerous, are of exceptional power and merit, among the more notable being the *Baggage Wagon*, *Dredging on the Medway* and *The Slave Market*, all exhibited in the Manchester collection of 1887, and the *Salmon-weir* at South Kensington.

Mullet (mul'et), a name common to two groups of acanthopterygian fishes, viz., the family Mugilidæ, or gray mullets; and the family Mullidæ, or red mullets. Naturalists, however, generally restrict the name to the former, designating the red mullets as sur-mullets. Of the true mullets the best-known is the common gray mullet (*Mugil capito*), found round the shores of the British islands, and in particular abundance in the Mediterranean. It grows to the length of 18 to 20 inches, and will sometimes weigh from 12 to 15 lbs. It has the habit of rooting in the mud or sand in search of food. Another species, also called gray mullet (*M. cephalus*), a native of the Mediterranean, is distinguished by having its eyes half covered by an adipose membrane. It weighs usually from 10 to 12 lbs., and is the

most delicate of all the mullets. A smaller species, the thick-lipped gray mullet (*Lisa chelo*) is common on the European coasts.

Mulligan Letters (mul'li-gan), a series of business letters, written by James G. Blaine to Warren Fisher of Boston, which fell into the hands of Fisher's bookkeeper, Mulligan. They played an important part in the political discussions of 1876 and 1884. It was alleged by Blaine's opponents that they confirmed charges of corruption brought against him in connection with certain railroads.

Mullion (mul'yun), a vertical division between the glass panes of windows, screens, etc., in Gothic architecture.

Mulock, DINAH MARIA. See *Craik*.

Mulready (mul'red-i), WILLIAM, was born at Ennis, Ireland, in 1786; died in 1863. He became a student of the Royal Academy about 1800; exhibited *The Rattle* (1808), *The Carpenter's Shop* (1809), at the Royal Academy, and his *Idle Boys* (1815) secured his election as an associate of the Academy, while the following year he was elected an academician. He produced many other popular pictures.

Mummy of Penamen, priest of Amun Ra.-British Museum.

Multan, or MOOLTAN' (möl'tän) a city of India, in the Punjab, the chief city and capital of a district of same name, is situated 4 miles from the Chenab, is partly surrounded by a wall. Pop. (1911) 99,243.

Multigraph (mul'ti-gråf), the trade name for a combined multiple typewriter, typesetter and rotary printing press, much used for the duplication of letters, etc., in large business establishments.

Multiple (mul'ti-pl), in arithmetic, a number which contains another an exact number of times without a remainder; as, 12 is a *multiple* of 3, the latter being a *submultiple* or aliquot part. A *common multiple* of two or more numbers contains each of them a certain number of times exactly; thus 24 is a common multiple of 3 and 4. The *least common multiple* is the smallest number that will do this; thus 12 is the least common multiple of 3 and 4. The same expression is used for algebraic quantities.

Multivalves (mul'ti-valvz), the name given to such shell-fish or molluscous animals as possess shells which consist of more than *two* pieces. See *Mollusca*.

Mum, a malt liquor which derives its name from Mumme, a German, who first brewed it. It is made of the malt of wheat, with the addition of a little oat and bean meal, is of dark-brown color and sweetish taste.

Mummies (mum'ez), dead human bodies embalmed and dried after the manner of those taken from Egyptian tombs. An immense number of mummies have been found in Egypt, consisting not only of human bodies, but of various animals, as bulls, apes, ibises, crocodiles, fish, etc. The processes for the preservation of the body were very various. Those of the poorer classes were merely dried by salt or natron, and wrapped up in coarse cloths and deposited in the catacombs. The bodies of the rich and the great underwent the most complicated operations, and were laboriously adorned with all kinds of ornaments. Embalmers of different ranks and duties extracted the brain through the nostrils, and the entrails through an incision in the side; the body was then shaved, washed, and salted, and after a certain period the process of embalming (see *Embalming*), properly speaking, began. The whole body was then steeped in balsam and wrapped up in linen bandages; each finger and toe was separately enveloped, or sometimes sheathed in a gold case, and the nails were often gilded. The bandages were then folded round each of the limbs, and finally round the whole body, to the number of fifteen to twenty thicknesses. The head was the object of particular attention; it was sometimes enveloped in several folds of fine muslin; the first was glued to the skin, and the others to the first; the whole was then coated with a fine plaster. The Persians, Assyrians, Hebrews and Romans had all processes of embalming, though not so lasting as that of Egypt. The art also was practiced by the Guanches of the Canaries, the Mexicans, Peruvians, etc. Natural mummies are frequently found preserved by the dryness of the air.

Mummy-wheat, a variety of wheat, the *Triticum turgidum compositum*, cultivated in Egypt, Abyssinia, and elsewhere; said falsely to be a variety produced from grains found in the case of an Egyptian mummy.

Mumps, a disease consisting in a peculiar and specific unsuppura-

tive inflammation of the salivary glands, accompanied by swelling along the neck, extending from beneath the ear to the chin. Children are more subject to it than adults.

München (mûnh'ĕn). See *Munich*.

Münchhausen (mûnh'hou-zn), KARL FRIEDRICH HIERONYMUS, BARON VON, a German officer, born in Hanover in 1720; died in 1797. He served in several campaigns against the Turks in the Russian service 1737-39. He was a passionate lover of horses and hounds of which, and of his adventures among the Turks, he told the most extravagant stories; and his imagination so completely got the better of his memory that he finally believed his fictions. *Baron Munchhausen's Narrative*, a small book of 48 pages, appeared in London in 1785. Two years after it was translated into German by Bürger, who naturally passed in Germany for the writer. The real author was Rudolf Erich Raspe (1737-94).

Muncie (mun'sē), a city, county seat of Delaware Co., Indiana, on White River, 54 miles N. E. of Indianapolis, on Lake Erie & Western, Big Four, Pennsylvania, Chesapeake & Ohio, and Central Indiana R. Rs. It has extensive manufactures of automobiles, glass products and many other products. Seat of Muncie Normal Institute. Pop. (1910) 24,005; (1920) 36,524.

Munden (mûn'den), a town of Prussia, in Hanover, at the confluence of the Fulda and Werra, which here unite to form the Weser, 14 miles W. S. W. of Göttingen. Pop. 10,755.

Mungo (mun'gō), a material similar to shoddy, being made from old woolen fabrics torn up for remaking.

Mungo, ST., or KENTIGERN, the patron saint of Glasgow, an early apostle of the Christian faith in Britain, is said to have been the son of St. Theneu and a British prince, and was born at Culross about 514, and brought up by St. Serf, the head of a monastery there, whose favorite pupil he became. His name, Kentigern, was exchanged by the brethren of the monastery for *Mungo*, the beloved, on account of the affection they bore him. On leaving Culcross Kentigern founded a monastery on the banks of a small stream flowing into the Clyde, subsequently the site of Glasgow Cathedral. Having some troubles with the king of the Strathclyde Britons, he afterwards took refuge with St. David in Wales, and while in this country he founded a religious establishment under a follower named Asaph, which afterwards became the seat of the bishopric of St. Asaph. He returned to Glasgow, where he acquired a character of great sanctity, and died about 601. Numerous miracles were ascribed to him, and several legendary biographies are preserved.

Mungoose (mun'gös; *Herpestes griseus*), a species of ichneumon, otherwise known as the 'gray' or 'Indian' ichneumon. Being easily domesticated it is kept in many houses in Hindustan to rid them of reptiles and other vermin, as rats, mice, etc. It has been said that it neutralizes the poison of snakes, which it fearlessly attacks, by eating, during its contests with them, the *Ophiorhiza Mungos*, or snake-root; but its immunity is really due to the extreme celerity of its movements. It is of a gray color flecked with black, and about the size of a rat.

Munhall, a borough of Allegheny Co., Pennsylvania, on the Pennsylvania Railroad. Pop. 6418.

Munich (mū'nik; German, *München*), the capital of Bavaria. It lies on an extensive but uninteresting plateau, about 1700 feet above sea-level, chiefly on the left bank of the Isar. The old town has a quaint and irregular character, but the new town, which has sprung up chiefly to the north and west, has a regular and imposing appearance, and altogether Munich is one of the finest towns in Germany. Vast improvements are due to the munificence of King Ludwig I. The royal palace forms a very extensive series of buildings chiefly in the Italian style, and contains many magnificent apartments and rich artistic and other treasures. Connected with it are the court church and the court and national theater, among the largest in Germany. The city is highly celebrated for its fine galleries of sculpture (Glyptothek) and painting (Old and New Pinakothek), and for various other important collections, such as that of the Bavarian national museum. The royal library (occupying a fine building in the Florentine style) has upwards of 1,000,000 volumes and 30,000 MSS., being thus one of the largest in Europe. The university is attended by some 7000 students, and has a library of 600,000 volumes. There is an academy of science, an academy of arts, and many fine churches, including the cathedral, founded in 1488. Munich is also a celebrated music center. It has numerous industries, including painted glass and other artistic productions, mathematical, optical and surgical instruments, gold and silver lace, jewelry, glass, carriages, bells, musical instruments, beer, etc. Munich is the seat of the high courts of legislature

and of law, and of all the more important offices of the State. It was founded by Henry, duke of Saxony, in 962; taken by Gustavus Adolphus in 1632, by the French under Moreau in 1800, and by Napoleon in 1805. Pop. (1919) 630,711.

Municipal Government, the local self-administration of a city, town, village or other minor civil division. The city government may consist of a mayor and council, or a commission, or a commission-manager and assistants. In England the mayor is hardly more than an ornamental figure. In Germany he is a trained official. In America he has extensive administrative powers. See *Municipal Government in the United States.*

Municipal Government in the United States. Municipal government in the United States has a history which begins with the chartering of New York City (1686). Other colonial municipalities chartered were: Albany (1686), Philadelphia (1691), Annapolis (1696), Norfolk (1736), Richmond (1742), and Trenton (1746). No cities or boroughs were chartered in early New England, government by town meeting prevailing instead.

Municipal charters were first granted by the governors of the colonies, because the governors were the king's representatives, and in England such charters were granted by the king. The form of government followed that of the English municipal corporation. Usually the governing body was a single council, composed of mayor (often appointed by the governor), aldermen and councilmen (usually elected), sitting together.

After the Revolution the state legislatures took over most of the former duties of the royal governors, including the granting of municipal charters. Consequently charters became legislative *acts*, which the legislature could amend or repeal as any other of its acts; and cities came completely under the domination of the legislatures, which soon afterward fell to the very lowest ebb of quality.

Charters granted after the Revolution provided for election of mayors; wider extension of suffrage; and several features illogically copied from the new federal and state governments. Thus, the mayor and council were made separate and independent; the mayor's veto power was established; councils were divided into two chambers; and the upper chambers assumed certain executive duties, such as confirming the mayor's appointments.

America's growing trade and manufacture, stimulated by invention and improved transportation, began to draw people cityward. In 1700, no colonial municipality had reached the 8000 mark. Boston (6700) was largest. By 1790, there were only five cities of 8000 or over, with an aggregate population less than 3½ per cent of the total population of the country. By 1850, the number of cities of 8000 or over had increased to 85, with a population of more than 3,000,000 or 12½ per cent of the country's total. New York was a city of 660,000; Philadelphia, of over 400,000.

Concentration of people in cities made the functions of municipal government more important. The colonial boroughs did little more than provide for maintaining order and preventing nuisances; for requiring private precautions against fires; and for regulating the cleaning and paving of streets by householders. Before 1700, however, the larger places had begun to construct drains, pave streets, provide street lights, and buy fire engines. New York had the rudiments of a police force by 1825. Boards of health were established in New York (1805), Philadelphia (1818), and Chicago (1837). Boston (1823) supplanted private sewers with a municipal system. Buffalo (1837) introduced the first city superintendent of public schools. By 1850, Boston had established the first municipal free public library. New York, Philadelphia and Baltimore had established large public parks. New York had completed the Croton aqueduct system, America's first comprehensive system of water supply. Street traffic had outgrown cobblestones, necessitating the introduction of Belgian block. In 1853, New York made it possible for her policemen to be appointed independent of ward politics, and to hold their positions during good behavior, the result being the first American police force that could be permanent, disciplined, and capable of organized action. In the same year, Cincinnati made the first municipal use of a steam fire engine.

The simple administrative duties of early days had been looked after by council committees. As duties became complex, councils appointed administrative officials to head departments. Because members of council were elected from wards and at party elections, the appointments which they made were treated as political patronage. This, coupled with the American doctrine of 'rotation in office,' killed any initiative for skill and efficiency in the municipal service. Administrative officials, therefore, became elected by popular vote (New York charter, 1849; Cleveland, 1852, etc.). But the offices were still in party politics. Furthermore, voters have always chosen people for office on the basis of their per-

sonal affability, not their administrative qualifications. Two new developments consequently followed: (1) Administrative officials were appointed by the mayors, instead of being elected. (2) Many important municipal functions were transferred from the cities to special state boards or commissions; cf. state police boards for New York City (1857), Baltimore (1860), St. Louis (1861), Chicago (1861), Detroit (1865), Cleveland (1866), Cincinnati (1876), Boston (1885); state park commission and state board of supervisors of county courts, New York City (1857); state commissions to control the fire department, health department, and liquor licensing, New York City (1865); state commission to build a city hall for Philadelphia (1870). State commissions were not satisfactory, however, because state politics were just as bad as local politics. State commissioners felt little or no responsibility to the locality which the commission served, and local citizens could not control either their actions or the amount of money spent, which local taxpayers had to raise.

Cities, moreover, had no powers except those granted by the legislatures. Frequently charters were amended without, and even against, local consent; while new powers which were needed often were refused, or granted only after severe struggle. This was true especially of adequate taxing power, and of powers which might interfere with some influential private interest. Legislatures granted away valuable municipal franchise rights, and used the cities as a political football, even 'ripping' uncongenial city officials from office by statute.

Cities, too, were entangled in the spoils system, made worse because of America's habit of voting by party label, and the consequent confusion of local with state and national political issues. Many city officials were just as corrupt as the legislatures, especially in granting franchises and misspending money which was so easily raised by issuing bonds. The period 1850-1875 was a dark quarter-century for American cities. The Tweed 'ring' flourished in New York, and similar political alliances in practically every other city of considerable size. Uncounted millions of public funds were squandered or put into private pockets.

To all this there was a reaction, and the quarter-century 1875-1900 was a period of constructive reform, as well as of unprecedented growth in municipal population and functions. Most of the state administrative commissions were abolished. One by one the state constitutions prohibited 'special legislation,' or passage of laws applying to one city alone. Missouri (1875), California (1879), Washington (1889), and Minnesota (1898) granted municipal home rule, *i. e.*, constitutional authority to cities (1) to frame, adopt and amend their own charters, and (2) to exercise certain powers of local self-government without having to go to the legislature for them.

The merit system, basing appointments in civil service on competitive examination and protecting officeholders against removal for partisan political reasons, was introduced (New York City, 1873; New York State, 1883; Massachusetts, 1884; Illinois, 1895). Election reforms were effected, and some elements of annual budget procedure were established. More authority and responsibility were concentrated in the mayors; but the structure of government in 1900 diverged very little from that of 1790.

In 1900, the mayor-and-council government of Galveston, Texas, was unable to cope with the havoc wrought by the Galveston flood, and the city was placed temporarily under a commission of five business men. They administered its affairs so satisfactorily that the form of government with modifications was adopted permanently by Galveston, and then by hundreds of cities. Commission government replaces mayor and council with one commission, usually of five members. These members sitting together pass ordinances and perform other legislative duties. Separately, they manage the administration of the city, which is divided into as many departments as there are commissioners. The principal advantage of commission government is that it concentrates the management of city affairs in one small body which can conduct them with dispatch, using modern business methods. Responsibility is hard to evade and friction and delay are reduced. Among cities governed by commissions are Buffalo, Newark, New Orleans, Portland (Ore.), St. Paul, Birmingham, Omaha, Memphis, Dallas, Des Moines, and Salt Lake City.

The success of commission government set a new pace in the progress of our cities, yet the form of government was found to have serious defects. There was no superior head to bind together the administrative departments. Usually the commissioners elected were amateurs in administration, whereas the work of their departments required professional or technical skill. To remedy these defects the city-manager or commission-manager plan was adopted successfully in Dayton, Ohio (1913), Springfield (Ohio), Jackson (Mich.), Grand Rapids, Niagara Falls, San Diego, San Jose (Calif.), Norfolk, Portsmouth, Wichita (Kans.), Houston, St. Augustine, Tampa, Miami, and other

cities. It provides for a commission which acts legislatively and supervises administration; but instead of dividing the administrative departments among its members it appoints a city manager, whom it holds responsible for results. To the manager is given power and authority to enforce ordinances, manage the affairs of the city, and appoint and remove subordinates. High grade men have been attracted to city-managership and are making the work a profession. In 1921 there were 227 cities in the United States and seven in Canada under city-manager government. Miami, which is under the commission-manager form of government, has a city commission composed of bankers—five in number.

Municipality (mū-ni-si-pal'i-ti), a town or city possessed of certain privileges of local self-government, derived from incorporating charters granted by the state. Or the term may be applied to the corporation or body of persons in a town having the powers of managing its affairs. See *Borough*, *Burgh*, *Corporation*, *Election*, etc.

Municipal League, an association for the reform or improvement of city government. Good government clubs, committees of citizens, etc., have been formed from time to time in American cities for this purpose. In Philadelphia the society for this purpose took the name of Municipal League, and in 1894, at a reform convention in that city, a National Municipal League was organized, which since then has held annual sessions in different cities, and has issued reports of interest and value in the education of civic voters in the subject of municipal reform.

Municipal Ownership, the ownership of public utilities in cities by the municipality. The movement in this direction has made considerable progress in Britain and some other parts of Europe, many cities there owning their chief utilities, including the street railways, and managing them in the interest of the citizens. This movement has made less progress in the United States, beyond water, gas and electric lights.

Munising (mū'ni'sing), a city, county seat of Alger Co., Michigan, 45 miles E. S. E. of Marquette. Has lumber, shingle and paper mills, etc. Pop. (1920) 5037.

Munjeet (mun'jēt), or East Indian madder, a dye-stuff closely allied to the common madder, and used for producing similar colors, obtained from the roots of *Ruba cordifolia*, a plant grown very extensively in several parts of India.

Munkacs (mûn'kăch), a town of Czechoslovakia on the Latorcza, in the extreme eastern part of the country. In the vicinity are mines of rock-crystal. Pop. 18,000.

Munkácsy (mön-kä'chē), MIHALY, real name *Michael Liel*, a Hungarian genre and historical painter, born at Munkacs in 1846; studied at Gyula, Vienna, Munich, and Dusseldorf, and settled in Paris in 1872. Among his best-known pictures are *Last Day of a Condemned Man*, *Milton Dictating Paradise Lost*, *Christ Before Pilate* and *The Crucifixion*. He died in 1900.

Munsey (mun'sey), FRANK ANDREW, an American publisher, born at Mercer, Me., 1854. He became publisher of the *Golden Argosy*, a juvenile weekly, in 1882; this later became the *Argosy*, for adults. *Munsey's Magazine*, first published in 1891, was an outgrowth of *Munsey's Weekly* (1889). Besides magazines, Mr. Munsey became owner of newspapers in New York and Baltimore. Author of *Afloat in a Great City*, *Derringforth*, etc.

Munster (mun'stir), the southwest province of Ireland, comprising the six counties of Clare, Cork, Kerry, Limerick, Tipperary and Waterford. Area, 9475 square miles. Pop. 1,075,095.

Münster (mûn'stêr), a town of Prussia, capital of the province of Westphalia, in a wide plain on the Aa, 78 miles N. N. E. of Cologne. It was once fortified, but the fortifications have been converted into promenades. The principal edifices are the cathedral, the church of St. Lambert, the town-house, the exchange, museum, theater, university, seminary, etc. The manufactures include woolen, linen, and cotton goods, etc. The most memorable event in the history of the town occurred in 1532-35, when it fell into the hands of the fanatical Anabaptists. (See *Anabaptists*.) Pop. 100,452.

Münsterberg (mûn'ster-berg), HUGO, a German-American psychologist, born at Danzig, 1863; died in a classroom at Harvard University, 1916. He was professor of psychology at Harvard 1892-1916. Author of *Psychology and Life*, *Science and Idealism*, *Psychology and Industrial Efficiency*, etc.

Muntjac (munt'jăk), a small species of deer, the *Cervulus muntjac*, found in British India, the Malay Peninsula, Sumatra, Java and Borneo, about 26 inches high at the shoulder. They are of solitary habits; the male has short horns, and they use their teeth effectually in self-defense.

Muntz Metal (from its inventor, a Mr. Muntz of Birmingham), an alloy of 60 parts copper

and 40 parts zinc, used for sheathing ships and for other purposes.

Münzer (mŭnt'sĕr), THOMAS, a German fanatic, born about 1490; executed in 1525. He is said to have studied at Wittenberg. He preached at Zwickau in 1520, and at Prague in 1521, and he was connected with the early movements of the Anabaptists. He held a mystical belief in continuous divine revelation through dreams and visions, and promulgated the doctrine of community of goods. He collected a large number of peasant followers, who committed many outrages, but in 1525 Münzer was taken and executed.

Murad V (mō'rad), Sultan of Turkey, born in 1840. Son of Abdul-Medji, he succeeded to the throne on the forcible deposition of Abdul Aziz in 1876, but was deposed in the course of the same year on account of insanity, and was succeeded by his younger brother, Abdul Hamid. He died in 1904.

Muræna (mū-rē'na), a large eel, type of the family Muræniдæ. It has no pectoral fins, and the dorsal and anal fins are very low and are united. The muræna of the ancients was *M. helena*. Most species are predaceous and are armed with strong pointed teeth.

Mural Decoration, the art of decorating walls, either by painted surfaces or by spaces carved in relief. As early as 4000 or 5000 B.C., in ancient Egypt mural paintings were carried to a high pitch of merit.

Mural Painting in the United States. The native school may be said to have begun with the decoration (1876-77) of Trinity Church, Boston, by John La Farge. This was followed by the decoration of the State Capitol in Albany, N. Y., executed in 1878 by William Morris Hunt, unfortunately since destroyed. The next important achievement was the decoration of the Boston Public Library by John Sargent, Puvis de Chavannes and Edwin A. Abbey. Later works of note are the decoration of the Baltimore Court House by E. H. Blashfield, C. Y. Turner and John La Farge; of the Pennsylvania State Capitol by Violet Oakley, Edwin A. Abbey and John W. Alexander; of the Iowa Capitol by Kenyon Cox; of the Carnegie Institute at Pittsburgh by John W. Alexander; of the Congressional Library at Washington, D. C., by a number of artists, and of the Minnesota State Capitol by La Farge, Blashfield, Cox, F. D. Millet and Edward Simmons.

Murat (mū-rä), JOACHIM, a French marshal, born in 1771; died in 1815. He entered the French army in 1791 and rose to the rank of lieutenant-colonel; was afterwards removed as a terrorist, and remained without employment till his fate placed him in connection with Bonaparte, whom he followed to Italy and Egypt, becoming general of division in 1799. In 1800 he married Caroline, the youngest sister of Bonaparte. He was present at the battle of Marengo, and in 1804 was made marshal of the empire, grand-admiral, and prince of the imperial house. His services in the campaign of 1805 against Austria, in which he entered Vienna at the head of the army, were rewarded in 1806 with the grand-duchy of Cleves and Berg. In the war of 1806 with Prussia, and of 1807 with Russia, he commanded the cavalry, and in 1808 he commanded the French army which occupied Madrid. He anticipated receiving the crown of Spain, Charles IV having invested him with royal authority; but Napoleon, who destined Spain for his brother Joseph, placed him on the throne of Naples, July 15, 1808. He shared the reverses of the Russian campaign of 1812, and in 1813 again fought for Napoleon, whose cause he deserted after the battle of Leipzig. He took up arms again in 1815 for Napoleon; but being defeated by Generals Neipperg and Bianchi near Tolentino, May 2 and 3, he was forced to leave Italy, and took refuge in Toulon. After the overthrow of Napoleon he escaped to Corsica, and set sail for the Neapolitan territory with a view to recover his kingdom. He landed at Pinzo on October 8, but was immediately captured, tried by a court-martial, and shot.

Muratori (mö-ra-tō'rē), LUDOVICO ANTONIO, an Italian historian, born in 1672; died in 1750. He was successively librarian at Milan and ducal archivist and librarian at Modena. He made many valuable contributions to Italian history, notably *Rerum Italicarum Scriptores ab Anno 500 ad 1500* (twenty-seven vols., folio, 1723-51), *Antiquitates Italicæ Medii Ævi* (six vols., 1738-42), *Annali d'Italia*, etc.

Murchison (mur'chi-sun), SIR RODERICK IMPEY, a Scottish geologist, born at Tarradale, in Rossshire, in 1792; died in 1871. He studied at the military college, Great Marlow, and at Edinburgh University; joined the army and served in the Peninsular war (1807-08). After the peace of 1815 he retired from the army and devoted himself to scientific pursuits, particularly geology, spending many years in the investigation of various parts of England, Scotland, and the Continent. In 1831-32, and again in 1842-43, he was elected president of the Geological Society. By a comparison of specimens of the rocks of Australia with

the auriferous rocks of the Ural Mountains, which he had personally examined, he was led, so early as 1845, to predict that gold would be found there. He was one of the founders and most active members of the British Association for the Advancement of Science, and he presided over the meeting of that association at Southampton in 1846. In 1855 he was appointed director of the Geological Survey and of the Royal School of Mines. He was several times elected president of the Royal Geographical Society; after 1862 he was by general consent always reëlected, and he remained president of that society till within a few months of his death. He was made a baronet in 1863. His chief works are *Siluria*, *The Geology of Russia*, and numerous contributions to the transactions of the learned societies. He endowed the chair of geology in Edinburgh University.

Murcia (mur'thi-ȧ), a city of Southern Spain, capital of the ancient kingdom and modern province of same name. The city is walled, and the streets are generally broad, straight, and well paved. Among the public buildings the most important is the cathedral, whose principal façade, a combination of Corinthian and Composite architecture, produces a fine effect. It was begun in 1353. The episcopal palace is one of the finest in Spain. There are manufactures of woolens, silk stuffs, linens, etc. Pop. 124,985.—The province formed part of the ancient kingdom of Murcia; area 4453 square miles; pop. 577,987. A considerable portion is composed of ranges of hills, containing mines of copper, iron, lead, and silver, and quarries of marble. There are also extensive plains, which are rendered amazingly fruitful by irrigation. The ancient kingdom, after passing through the hands of the Romans and Goths, was conquered by the Moors in 713, and continued under them till 1240, when it became a dependency of Spain.

Murder (mur'dẽr), the act of unlawfully killing a human being with premeditated malice, the person committing the act being of sound mind and discretion, and the victim dying within a year and a day after the cause of death administered. In Britain it is the law that every person convicted of murder shall suffer death as a felon. In the United States the law recognizes degrees in murder, and in France and some other civilized nations 'extenuating circumstances' are taken into consideration.

Murdoch (mur'dok), JAMES EDWARD, actor, was born at Philadelphia in 1811 and made his first stage appearance in that city in 1826. He was versatile and played many leading parts, being for years a favorite comedian. He made his first appearance in tragedy in *Hamlet*, in 1845. During the Civil war he gave readings for the benefit of the Sanitary Commission. He was the author of several text-books on elocution. He died in 1892.

Murdoch (mur'doh), WILLIAM, an inventor, born near Auchinleck, Ayrshire, in 1754. His father was a millwright and miller, and under him William worked till he was twenty-three years of age. He then went to Birmingham, where he obtained employment in the engineering establishment of Boulton & Watt. A demand for Watt's engines was fast rising in the Cornish mines, and Murdoch was soon sent thither to superintend the erection and fittings of these. At Redruth, in 1784, he constructed a model high-pressure engine to run on wheels, the precursor of the modern steam locomotive; a year later he invented the oscillating engine, the system of which is still in use; and the rotary engine with sun-and-planet circular motion is also his invention. He made many improvements on Watt's engine on the lines of economizing steam and securing simplicity. About the end of the century he was made manager of the works of Boulton & Watt, being afterwards admitted as a partner. In 1803 he constructed a steam-gun; and some time later produced the well-known cast-iron cement made of iron-borings and sal-ammoniac. In 1815 he introduced the hot-water apparatus which, with certain slight modifications, is now so extensively used for heating large buildings and conservatories. Various other inventions of his might be mentioned; but his work as a gas inventor remains his most conspicuous achievement. In 1792 he first lighted his offices and cottage at Redruth with coal gas but it was not till 1798 that he constructed his first extensive apparatus at Birmingham for the making, storing, and purifying of gas, with a view to the supply of factories. Not long after this the offices at Soho were lighted with gas, and the new illuminant was brought prominently before public notice in 1802, when the exterior of the factory was lighted up in celebration of the Peace of Amiens. His great invention was never patented. He retired from business in 1830, and died in 1839.

Mure (mūr), WILLIAM, historian, son of William Mure, of Caldwell, an estate on the borders of Renfrewshire and Ayrshire, was born at Caldwell, Renfrewshire, in 1799; died in 1860. He was educated at Westminster School, the Uni-

versity of Edinburgh, and the University of Bonn. In 1824 and 1825 he contributed to the *Edinburgh Review* articles on Spanish literature and other subjects. In 1829 he published *Brief Remarks on the Chronology of the Egyptian Dynasties;* in 1832 *A Dissertation on the Calendar of the Zodiac of Ancient Egypt;* in 1842 *Journal of a Tour in Greece and the Ionian Islands.* In 1846 he was elected member of parliament for Renfrewshire, for which county he continued to sit till 1855, when he resigned in consequence of ill health. In the winter of 1847-48 he was elected lord-rector of the University of Glasgow. His leading work, which was left unfinished at his death, *A Critical History of the Language and Literature of Ancient Greece,* was published in five volumes (1850-57).

Murex (mū'reks), a genus of gasteropod molluscs resembling the whelk; shell spiral, rough, with three or more ranges of spines simple or branched. Murices are remarkable for the beauty and variety of their spines. They were in high esteem from the earliest ages on account of the purple dye that some of them yielded.

Murfree (mur'frē), MARY NOAILLES, novelist, born in Murfreesboro, Tennessee, in 1856. She wrote under the pseudonym of Charles Egbert Craddock, her subjects having largely to do with the mountaineers of East Tennessee.

Murfreesboro (mur'frēz-bo-ro), a city of Tennessee, capital of Rutherford County, 30 miles S. E. of Nashville. It has flour and planing mills, tanneries, canneries, and cotton-gin works. It was the capital of Tennessee from 1819 to 1826, and nearby was fought one of the great battles of the Civil war (also called Battle of Stone River), December 31, 1862, to January 2, 1863, between the Federals under General Rosecrans and the Confederates under General Bragg. Pop. (1920) 5367.

Murger (mûr-zhār), HENRI, born at Paris in 1822; died in 1861. He lived a life of extreme privation; formed an informal club or society of unconventional young artists and authors similarly situated which was named 'Bohemia,' and the associates 'Bohemians'—a name famous in general literary history. He contributed a great mass of 'copy' to numerous periodicals, and at last made a reputation by his *Scènes de la Vie de Bohême.* He also published two volumes of poetry, *Ballades et Fantaisies,* and *Les Nuits d'Hiver;* and wrote dramas for the Luxembourg theater, and tales, etc., for the *Revue des Deux Mondes.*

Murghab (mōr-gäb'), a river of Asia, which rises in the mountains of Northern Afghanistan, and after a course of 400 miles loses itself in the sands surrounding the oasis of Merv.

Muriatic Acid (mū-ri-at'ik), the older name for hydrochloric acid (which see).

Muridæ (mû'ri-dē), the family of animals which includes the mice and rats.

Murillo (mų'rēl'yō), BARTOLOMEO ESTEBAN, the greatest of Spanish painters, was born at Seville in 1618. He received his first instruction in art from his relation, Juan del Castillo. In 1642 he visited Madrid, and was aided by Velasquez, then painter to the king, who procured him permission to copy in the Royal Galleries. Murillo returned to Seville in 1645, where he commenced that great series of works which have now made his name so glorious. He married a lady of fortune in 1648, which much aided his personal influence, and he succeeded in establishing an academy of the arts at Seville in 1660, and acted as president the first year. He died at Seville in

Murillo.

1682, in consequence of a fall from a scaffolding at Cadiz, where he was engaged in the church of the Capuchins, painting a large altar-piece of St. Catherine. In his early career he painted many pictures of humble life with much charm of grace and humor; but his most celebrated pictures are of a later period, and treat religious subjects with a mingled idealism and realism and a richness of coloring which has seldom been attained. Soon after his marriage he gave up his early cold (*frio*) style, and adopted his warm (*calido*) style. He obtained the

name of 'Painter of the Conception' from his fondness for the subject of the Immaculate Conception. About 250 of his pictures are preserved in British and foreign galleries, and in Spanish churches.

Murom (mö'rom), a town in Russia, in the government of Vladimir, 75 miles southeast of the town of Vladimir, on the left bank of the Oka, one of the oldest towns in Russia. Pop. 19,000.

Murphy, CHARLES FRANCIS, American politician, born in New York in 1858. He early interested himself in politics, and in 1891 became the Tammany Hall leader of his assembly district. He was a commissioner of docks and ferries, New York (1897-1901), and in 1902 was elected chief of Tammany.

Murphysboro (mur'fēs-bo-ro), a city, county seat of Jackson Co., Illinois, on the Big Muddy River, 62 miles N. of Cairo, on Illinois Central and other R. Rs. Has coal mines, steel and brick plants, iron works, railroad shops, etc. Pop. (1910), 7485; (1920), 10,703.

Murrain (mur'in), a name given in general to any widely prevailing and contagious disease among cattle, though in different localities it is given to some specific disease.

Murray (mur'ri), the largest river in Australia, rises in the Australian Alps about 36° 40′ S. and 147° E., its sources being partly in New South Wales, partly in Victoria; flows for a long distance westward, forming the boundary between the two colonies; then passes into South Australia, where it takes a southern direction, and falls into the sea through a large shallow sheet of water called Lake Alexandrina. There is a sand bar at the mouth which impedes navigation, but small steamers ascend the river as high as Albury, 1700 miles from its mouth. Its chief tributaries are the Murrumbidgee, the Darling and the Lachlan. The Darling before its junction with the Murray may even be considered the main stream.

Murray, DAVID CHRISTIE, novelist, born in 1847; commenced life on the Birmingham press, was connected with London newspapers, and acted as special correspondent during the Russo-Turkish war. He then took to fiction, and wrote a number of popular novels, among them *Aunt Rachel, The Weaker Vessel, The Way of the World, The Making of a Novelist, The Bishop's Amazement*, etc. He died in 1907.

Murray, EARL OF. See *Moray*.

Murray, JOHN, an eminent London publisher, born in 1778 (father's name MacMurray); died in 1843. He began business when quite young, early attained success, and became the friend of as well as publisher for some of the chief writers of the day, including Byron, Moore, Rogers, Campbell, Crabbe, Washington Irving, etc. He started the *Quarterly Review* in 1809. The well-known *Handbooks for Travelers* were originated by his son.

Murray, LINDLEY, grammarian, born in Pennsylvania, of Quaker parents, in 1745; died in 1826. About the age of twenty-one he was called to the bar, and acquired an extensive practise. On the outbreak of the Revolutionary war he retired to the country, but four years after engaged in mercantile pursuits, and by the close of the war had realized a competence. In 1784 he went to England and purchased the estate of Holdgate, near York, where he passed the remainder of his life. He wrote, besides his well-known *English Grammar*, several works on education and morals.

Murrine (mur'ēn; or MURRHINE) Vases of (*vasa murrhina*), splendid antique vessels which were equally distinguished for the costliness of their material and the beauty of their execution. They were brought, according to Pliny, from Carmania, now Kerman in Persia, and bore an immense price. Vases of this ware were used in Rome as wine cups, and were believed to have the quality of breaking if poison were mixed with the liquor they contained. There is doubt about the material of these vases, though the probability is they were made of fluorspar or of the fluoride of calcium.

Murrumbidgee (mur-um-bid'jē), a large river of Australia, in New South Wales, rising in the great Dividing Range, and entering the Murray after a westward course about 1300 miles chief tributary, the Lachlan.

Murshidabad, (mör-shed-ä-bäd), or MOORSHEDABAD, a city of India, Bengal, capital of a district of same name, on the left bank of the Bhagirathi. It was the capital of Bengal till 1772, since which time its historical importance has departed. The city, with its suburb Azimganj on the opposite bank of the river, is the chief center of trade and manufacture in the district. The industries include an extensive silk industry, the embroidery of fancy articles with gold and silver lace, ivory carving, and the making of musical instruments. Its population in 1825 was still about 150,000. In 1901 it had fallen to 15,168. Azimganj had 13,383.

Murten. See *Morat.*

Murzuk. See *Mourzouk.*

Musaceæ (mū-zā'se-ē), a nat. order of endogenous plants, of which *Musa* is the typical genus. It includes the abaca or manila hemp, the banana and the plantain.

Musæus (mū-sē'us), an ancient Greek poet, almost fabulous, said by some to be the son of Eumolpus and Selene, by others, of Linus or Orpheus. He is credited with the mystic and oracular verses of the Eleusinian and other mysteries. The ancients attribute to him many works, of which some verses only have come down to us as quotations in Pausanias, Plato, Aristotle, etc. A later Musæus, who probably lived four or five centuries after Christ, is the author of an erotic poem of the loves of Hero and Leander.

Musäus (mu̧-zä'u̧s), JOHANN KARL AUGUST, German author, born in 1735; died in 1787. He studied theology; was master of the pages at the Weimar court, and in 1770 was appointed professor in the gymnasium at Weimar. Among his writings, which are characterized by humor, simplicity, and a kindly satire, are *Der Deutsche Grandison* ('The German Grandison'), *Physiognomische Reisen* ('Physiognomic Travels'), *Volksmärchen der Deutschen*, ('German Popular Tales'), and a series of tales under the title *Straussfedern* ('Ostrich-feathers').

Musca (mus'ka), a Linnæan genus of dipterous insects, including the flies; now expanded into a family (Muscidæ).

Muscæ Volitantes (mus'se vol-i-tan'tēz; lit. 'floating flies'), in physiology, the name given to ocular spectra which appear like motes or small bodies floating before the eyes. One class of these specks are a common precursor of amaurosis (which see); but another class are quite harmless.

Muscardine (mus-kär'dēn), a contagious disease in silkworms caused by a fungus.

Muscat (mus'kat), or MASKAT, the chief city of the sultanate of Omân, or Muscat, a seaport on the Indian Ocean, near the east angle of Arabia. The town stands in a hollow, under cliffs 400 feet or 500 feet high. Large buildings are few, and the sultan's palace (a plain edifice), the governor's house, and a few minarets alone rise above the humble mass of flat-roofed huts or houses. The streets are extremely narrow, and the town is one of the hottest places in the world. It is an important center of trade, exporting coffee, pearls, mother-of-pearl, dye-stuffs, drugs, etc., and importing rice, sugar, piece goods, etc. Pop. of town and suburbs estimated at 60,000.

Muscatel (mus-kā-tel'), or MUSCADEL, a term for various sweet, strong, and fragrant wines.

Muscatine (mus-ka-tēn'), a city and county seat of Muscatine Co., Iowa, on the Mississippi, 30 miles s.w. of Davenport, on Chicago, Rock Island & Pacific and other R. Rs. It has immense sash and door plants, canneries, and pearl-button factories. Automatic button machines are made here. It is in a noted farm section, and the hills abound in shale and clay of fine grade. Pop. (1910) 16,178; (1920) 16,068.

Muschelkalk (mu̧sh'el-kälk), a compact hard limestone of a grayish color found in Germany. It is interposed between the Bunter sandstone, on which it rests, and the Keuper variegated marls, which lie over it, and with which at the junction it alternates, thus forming the middle member of the Triassic system as it occurs in Germany. In England the Keuper rests immediately on the Bunter. It abounds in marine organic remains, its chief fossils being encrinites, ammonites and terebratulæ.

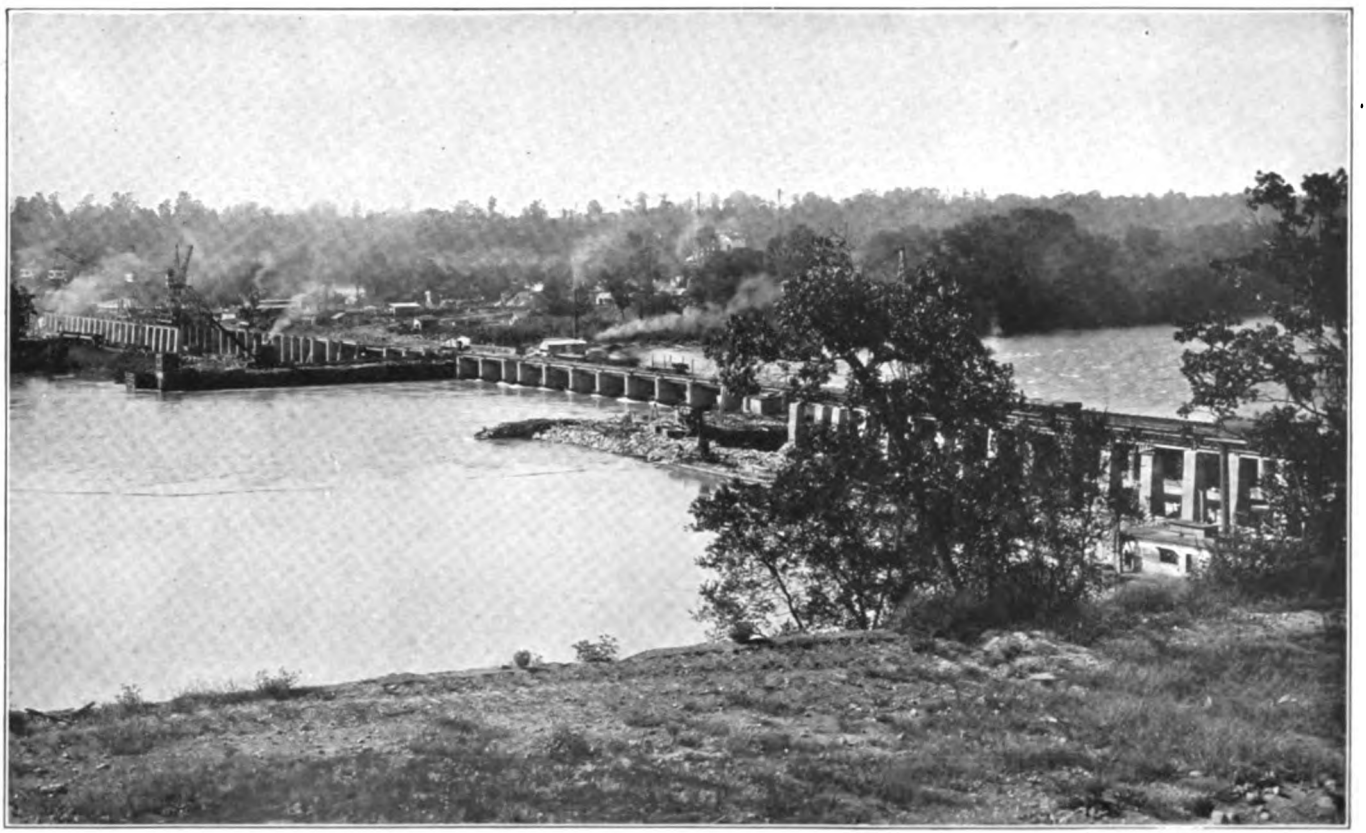
Musci. See *Moss.*

Muscidæ (mus'si-dē), a family of two-winged flies, of which the common house-fly (*Musca domestica*) is a familiar example.

Muscle and Muscular Motion

(mus'l). The name *muscle* is applied to those structural elements or organs in animals which are devoted to the production of movements, either of a part of the body, or of the body as a whole. They consist of fibers or bundles of fibers, susceptible of contraction and relaxation, enclosed in a thin cellular membrane. Muscles are composed of fleshy and tendinous fibers, occasionally intermixed, but the tendinous fibers generally prevail at the extremities of the muscle, and the fleshy ones in the belly or middle part of it. When the fibers of a muscle are placed parallel to each other it is called a *simple*

A Striped Muscular Fiber with its Sheath.

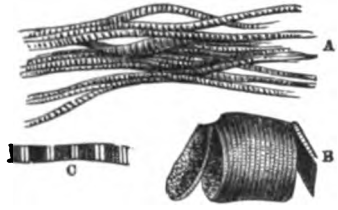


Courtesy of The Nation's Business

MUSCLE SHOALS

A view looking across the Tennessee River at the site of Muscle Shoals Dam No. 2, now called "Wilson Dam." The giant nitrate plant built here by the United States government for explosives for the war, was closed down after the armistice. Henry Ford's offer to buy the plant as a peace-time industry for the manufacture of nitrates for fertilizer purposes brought the great project again before the public at the beginning of 1922.

or *rectilinear* muscle; when they intersect and cross each other they are called *compound*. When muscles act in opposition to each other they are termed *antagonist;* when they concur in the same action they are called *congenerous*. Muscles are also divided into *voluntary* and *involuntary* muscles, the former being those whose movements proceed from an immediate exertion of the will, as in raising or depressing the arm, bending the knee, moving the tongue, etc., while the latter are beyond this control, being the agents in the contraction of the heart, arteries, veins, absorbents, stomach, intestines, etc. When examined under the microscope the fibers of the voluntary muscles (as also those of the heart) are seen to be marked by minute transverse bars or stripes, while those of the involuntary are smooth and regular in appearance. The former is therefore called *striped* or *striated* muscle, the latter *unstriped, nonstriated,* or *smooth* muscle. The great property of muscular tissue is the power of responding when irritated. The response is in the form of contraction, that is, when the muscle is irritated or stimulated it responds by shortening itself, so that its ends are brought nearer and it becomes thicker in the middle, its inherent elasticity making it capable of returning to its previous length when the stimulation is withdrawn. By these contractions the muscles are able to do work. The usual stimulation is by nervous action (see *Nerve*), but mechanical means, such as pinching, pricking, etc., electricity, heat and chemicals also cause irritation. All the muscles are connected with bones not directly but through the medium of tendons. A tendon presents the appearance of a white glistening cord, sometimes flat, but often cylindrical and of considerable thickness. The mass of flesh composing the muscle is called the *belly* of the muscle. One end is usually attached to a bone more or less fixed, and is called the *origin* of the muscle. The other end is attached to the bone meant to be moved by the contraction of the muscle, and is called the *insertion* of the muscle. Involuntary muscle consists of spindle-shaped cells having an elongated nucleus in the center. They are united in ribbon-shaped bands, and respond much less rapidly than the voluntary to irritations, and the wave of contraction passes over them more slowly.



Muscular Fiber separated—A into fibrillæ and B into discs. C is a highly magnified portion of a fibril.

Muscle Shoals, Alabama, on the Tennessee River, near Florence (q. v.), the site of the great Wilson Dam. Here during the World War the United States Government built immense nitrate plants. See *Nitrate of Soda.*

Muscogees (mus-kō'jēz), the Creek Indians. See *Creeks.*

Mus'covy (from *Moscow*), a name often applied to Russia.

Muscovy Duck. See *Musk-duck.*

Muses (mūs'ez), in the Greek mythology, the daughters of Zeus and Mnemosynē, who were, according to the earliest writers, the inspiring goddesses of song, and according to later ideas divinities presiding over the different kinds of poetry, and over the sciences and arts. Their original number appears to have been three, but afterwards they are always spoken of as nine in number, viz.—*Clio,* the muse of history; *Euterpē,* the muse of lyric poetry; *Thalia,* the muse of comedy, and of merry or idyllic poetry; *Melpomĕne,* the muse of tragedy; *Terpsichŏrē,* the muse of choral dance and song; *Erăto,* the muse of erotic poetry and mimicry; *Polymnia* or *Polyhymnia,* the muse of the sublime hymn; *Urania,* the muse of astronomy; and *Calliŏpe,* the muse of epic poetry.

Museum (mū-zē'um), a building or apartments used as a depository of articles which relate to art, science, or other fields of human interest, and where the contents are arranged for inspection. Collections of this kind are numerous in all civilized parts of the world, usually open to the public for instruction or recreation. Of these Britain has an admirable example, the most famous in the world, in the British Museum, and a second of much repute is the South Kensington Museum. Others of leading importance in Europe are the museums of the Vatican in Rome, of the Louvre in Paris, and those of St. Petersburg, Berlin, Vienna, Dresden, Munich and other cities. In the United States the National Museum at Washington is a richly-filled institution. Others of importance are the Peabody Museum at Harvard, the American Museum of Natural History at New York, the Peabody

Museum at Yale College, the museum of the Academy of Natural Sciences and the Commercial Museums at Philadelphia, the museums of the Boston Society of Natural History, the Field Museum at Chicago, and others elsewhere. Collections of art and other objects are equally numerous, though not usually known as museums. The Metropolitan Museum of New York is of this sort.

Mushroom (mush'röm), the common name of numerous cryptogamic plants of the nat. order Fungi. Some of them are edible, others poisonous. The species of mushroom usually cultivated is the *Agaricus campestris*, or eatable agaric, well known for its excellence as an ingredient in sauces, especially ketchup. (See *Agaric.*) Mushrooms are found in all parts of the world, and are usually of very rapid growth. In some cases they form a staple article of food. In Terra del Fuego the natives live almost entirely on a mushroom, *Cyttaria Darwinii;* in Australia many species of *Bolētus* are used by the natives, and the *Mylitta australis* is commonly called native bread. *Mushroom spawn* is a term applied to the reproductive mycelium of the mushroom.

Music (mū'zik), any succession of sounds so modulated as to please the ear; also the art of producing such melodious and harmonious sounds, and the science which treats of their properties, dependencies and relations. Sound is conveyed through elastic media, as the atmosphere or water, by undulations, which may be generated in the medium itself, as by a flute or organ pipe, or transmitted to it by the vibrations of violin or pianoforte strings or the reeds of a wind instrument. When the vibrations are fewer than 16 in a second or more than 8192 the sound ceases to have a musical character. The *pitch* or relative height of a tone is determined by the number of vibrations in a given time, the lower numbers giving the grave or deep tones, the higher numbers the acute or shrill tones. The loudness of a tone is determined by the largeness of the vibrations, not their number. The note or musical sound called middle C on the pianoforte is usually assumed by theorists to be produced by 512 vibrations per second, and this was long the pitch recognized in practice as the standard or *concert pitch* useful for the guidance of all musicians. The perpetual striving after increased brilliance of tone led, however, to a gradual heightening of the pitch, and in the course of a century the middle C in France had become 522 vibrations, while in England and Germany it was somewhat higher. Of late years there has been a movement among European musicians to lower the pitch to about the French standard, and this lower pitch has been now adopted by many foreign nations.

A note produced by double the number of vibrations required to produce any given note will be found to be in a perfect *unison* with it though higher in pitch. Between two such notes there is a gradation by seven intervals in the pitch of tone, more agreeable (at least to modern European ears) than any other, the whole forming a complete scale of music called the *diatonic scale.* The space between the notes sounding in unison is termed an *octave,* and the note completing the octave may become the *keynote* of a similar succession of seven notes, each an octave higher or double the pitch of the corresponding note in the first scale. These seven notes of the diatonic scale are designated by the first seven letters of the alphabet, and each note bears a fixed ratio to the keynote in respect of pitch as determined by the number of vibrations. Thus in the case of a keynote obtained from a vibrating string, its octave is produced by halving the string, which vibrates twice as fast in a given time as the whole string, and the other notes may be obtained by applying reciprocally the ratios given below to the length of the string.

Taking C or Do for our fundamental note we have for our scale—

C	D	E	F	G	A	B	C	D	E	F	G	A	B	C,	etc. (Scale in key of C major)
or Do	Re	Mi	Fa	Sol	La	Si	Do	Re	Mi	Fa	Sol	La	Si	Do,	etc.
1	⅛	¼	⅓	½	⅝	⅔	2								(Ratio to keynote).

The scale may be extended up or down so long as the sounds continue to be musical. In order to allow reference to be made to the various degrees of scales without reference to the key in which they are pitched the tones composing the octave are known in their ascending order as (1) *tonic* or keynote, (2) *supertonic,* (3) *mediant,* (4) *subdominant,* (5) *dominant,* (6) *superdominant* or *submediant,* (7) *leading note* or *subtonic,* (8) *final note.* The tonic, the subdominant, and the dominant are the governing or emphatic notes of the scales. In the diatonic scale the various notes proceed from the keynote by five *tones* and two *semitones;* the semitones (the smallest intervals recognized in musical notation)

occurring between the 3d and 4th and 7th and 8th notes in the scale. The first four and last four notes, therefore, form a natural division of the octave into two 'tetrachords,' each consisting of two tones and a semitone.

Every sound employed in the art of music is represented by characters called notes on a *staff*—that is, five equidistant horizontal lines on or between which the notes are placed. A note represents a higher or a lower sound according as it is placed higher or lower on the staff. When any note is higher or lower in pitch than can be placed upon the staff short lines called *ledger lines* are added above or below the staff to indicate the relation of the note to those on the staff. As, however, the multiplication of ledger lines is liable to become embarrassing to the eye, musicians have endeavored to overcome the difficulty by the use of more than one staff. The staves are the *bass*, *mean*, and the *treble*, but the second is now seldom used. The treble staff, which contains the upper notes, is distinguished by a character called a G or treble *clef* the bass by a character called the F or bass clef and the mean by a character called the C or mean clef .

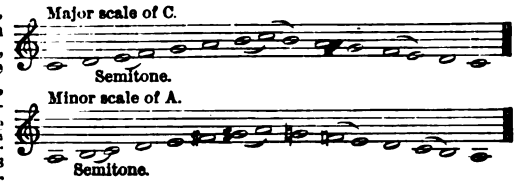
The treble and bass clefs only are required for keyed instruments of the pianoforte kind, and when a staff is wanted for each hand they are joined by a brace, the upper staff carrying the notes generally played by the right hand and the lower those played generally by the left, as follows:—

It will be seen that the steps in every diatonic scale must correspond to those of the scale of C, in that the notes composing it stand in the same fixed ratio to the keynote of the scale. In selecting another keynote than C, however, it is necessary to modify some of the natural notes by the insertion of what are called *sharps* or *flats* in order to preserve the required relation and sequence of the intervals (the tones and semitones in their due relative positions) and so produce the major musical progression. The sharp (♯) placed before a note raises the pitch by a semitone, the flat (♭) lowers it by a semitone. A sharp or flat placed at the beginning of a staff affects every note upon the line which it dominates, unless the contrary be indicated by the sign of the *natural* (♮), which restores the note to which it is attached to its normal pitch. In the model diatonic scale given it has been pointed out that there is an interval of a tone between every note, except the 3d and 4th (E and F) and 7th and 8th (B and C), when the interval consists of a semitone. Now if we wish to make G the keynote it is clear that without some contrivance the notation of the scale from G to its octave would throw one of the semitones out of its place—namely, that between E and F, which, instead of being, as it ought to be, between the seventh and eighth, is between the sixth and seventh. It is obvious then that if we raise the F a semitone we shall restore the interval of the semitone to a position similar to that which it held in the key of C. If D be taken as a keynote we shall find it necessary to sharpen the C as well as the F in order to bring the semitones into their proper places. Still proceeding by fifths, and taking A as a keynote, a third sharp is wanted to raise G. We may proceed thus till we reach the scale of C sharp, with seven sharps, which is, however, rarely used. This series of scales with sharps is obtained by taking the dominant, first of the model scale as the keynote and then of the others in succession, and sharpening the fourth of the original scales to make it the seventh of the new.

Another series is obtained by taking the subdominant of the model scale as the keynote and lowering its seventh a semitone, making it the fourth of the new scale, or scale of F. Taking the subdominant of the scale (B) as the keynote we require to flatten the E in addition to the B, and so on until we have lowered all the tones in the scale a semitone.

Besides the forms of the diatonic scale, which have an interval of two tones be-

tween the tonic and the third, and is called the *major scale*, there are *minor scales* of which the most important kind has an interval of a tone and semitone between its tonic and third, the seventh note being sharpened so as to form a leading note. In the ascending scale, too, the harsh interval of the second between this leading note and the one immediately below it is frequently avoided by sharpening the lower note. In the descending scale the sharps are removed, and the scale is identical with the major, beginning at its sixth and descending an octave. See example.



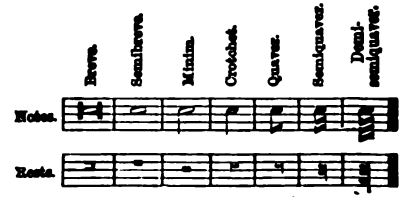
Major and minor scales which, like those given in the example, have the same key signature, are called *relative*. Thus, the major scale of G has for its relative minor the scale of E minor; the major scale of D has for its relative minor the scale of B minor; and so on. Each minor scale is also called the tonic minor to the major scale on the same keynote. The tonic minor scale to C major is C minor. One major scale is also said to be related to another when it is raised from its dominant or its subdominant: thus the scales of G and F are held to be nearly related to that of C.

There is still another kind of scale, called the *chromatic* (Greek *chrōma*, color), because, like colors in painting, it embellishes the diatonic by its semitones. It consists of thirteen notes, and usually ascends by sharps and descends by flats.

Intervals in music (*i.e.*, the distance from any one note to any other) are reckoned always upwards and inclusively by the number of names of notes they contain, both limits to the interval being counted. Thus C to E is a third, both C and E being counted in the interval. They are known as major or normal when they are such as would be found in any major scale; as minor when the interval consists of a semitone less than the corresponding major interval; as augmented when consisting of a semitone more than major; as diminished when a semitone less than minor; and as simple or compound according as they fall within or exceed the compass of an octave.

Hitherto notes have been referred to only as representatives of the various sounds with reference to their pitch and distances from each other; but each note serves also to mark the relative duration of the sound it represents. Below are given the names and forms of the notes commonly in use, each in succession being half the duration of the note preceding it.

The stems of the notes may be written upwards or downwards as convenient. In connection with these notes other signs are used still further to indicate duration. A dot placed after a note lengthens it by one-half, two dots by three-fourths. Instead of the dot a note of its value may be written, and a curve, called a *tie*, written over it and the preceding note. Sometimes three notes of equal value have to be played in the time of two, in which case the figure 3 with a curve thrown over it is written above or below the notes. Two *triplets* (as this group is called) may be joined, and the figure 6 surmounted by a curve written over them; they are then performed in the time of four notes of the same form. A sensible interval of time often occurs between the sounding of two notes; this is represented by characters called *rests*, each note having a corresponding rest. A dot may be added to a rest in the same manner as to a note, to indicate an addition of a half to its length. See the example just given, which shows the rests in connection with their corresponding notes.



Every piece of music is divided into portions equal in time, called *measures*, which are separated from each other by vertical lines called *bars*. The term bar is often loosely applied to the measure as well as to the line. The exact length of the measure is indicated by a sign at the beginning of the piece of music. In common time, indicated by a C written after the clef, each measure contains a semibreve, or such notes and rests as make up together its value. Another form of common time, marked with a ¢, contains two

semibreves in the measure, or their equivalents in minims, crotchets, etc. Another method of indicating time (or rather more correctly, rhythm) is by figures, in the form of a fraction. The figures of the denominator are either 2, 4, 8, or 16, which (the semibreve being considered the unit) stand for minims, crotchets, quavers, and semiquavers respectively; and the numerator shows the number of these fractional parts of a semibreve in the measure. Besides common time, which may be indicated in two ways, there is triple time, in which a measure is made up of three minims, crotchets, or quavers, which can only be marked by figures; these are $\frac{3}{2}$, $\frac{3}{4}$, or $\frac{3}{8}$. When two or four measures of triple time are united in one measure the music is said to be written in compound common time, and is indicated by the fractions $\frac{6}{4}$ and $\frac{12}{8}$; rarer examples of compound time signatures are $\frac{9}{4}$, $\frac{9}{8}$, $\frac{12}{16}$, $\frac{12}{4}$, etc. The object of the division of musical passages into measures is to indicate their rhythm. Notes, like words or syllables, are *accented* or *unaccented*. The strongest accent is given to the first note of a measure. In common time of four notes to the measure the third has a subordinate accent, as, though in a less degree, the third measure note in triple time. In compound common time the subordinate accents fall on the first note of the last half of the measure, and in compound triple time on the first note of each of the groups of three of which the measure is composed. When a curve is placed over two notes in the same degree, but not in the same bar, the two notes are played as one of the length of both, and the first note acquires the accent. This displacement of the accent is called *syncopation*. If the curve is written over notes of different degrees it is called a *slur*, and indicates that the notes are to be played or sung smoothly, as if gliding into each other. When an opposite effect is wanted, that is, when the notes are to be produced distinct and detached (*stacco*), a dot is placed over them. The various degrees of loudness and softness which occur in a piece of music are indicated by such Italian words as *forte*, loud; *fortissimo*, very loud; *piano*, soft; *pianissimo*, very soft. In order to save time in writing music various abbreviations are used.

Melody is a particular succession of sounds in a single part, and is produced by the voice or by an instrument. A melody generally consists of an even number of phrases; this number may be four, eight, twelve, or sixteen. A phrase generally corresponds with a line in a verse of poetry. In order to produce an agreeable variety a melody may pass from the form of the scale in which it started to another, generally to the one most nearly related to it, that of the dominant or subdominant. This change from one key into another is called *modulation*. Except in very rare cases a melody ends on its keynote. A musical composition may consist of a series or progression of sounds so connected that several of them may be heard at the same moment. When several voices or instruments produce at the same instant sounds different in pitch, and so combined as to cause an agreeable sensation on the ear, the combination is called *harmonious*, and the proper method of combining these sounds is called the art of *harmony*. The series of notes taken by a single voice or instrument capable of producing only one note at a time is called a *part*. Four parts are by far the most common; but five, six, seven, eight, and even more numerous parts are common in the ecclesiastical compositions and madrigals of the old masters. When two sounds heard together are agreeable to the ear they are called *concordant*, or are said to form a *concord;* if, on the contrary, they grate upon the ear they are said to be *discordant*, or to form a *discord*. Concords are of two kinds—perfect and imperfect. The perfect is the minor fourth, the perfect fifth and the octave; the imperfect are the major and minor third, and the major and minor sixth. A perfect concord is so called because its conterminate sounds cannot be raised or depressed without becoming discordant. If three or more sounds be heard at the same time the combination is called a *chord*. When a chord is composed of concords only, or in other words when it is composed of a fundamental sound accompanied by its third (major or minor) and its fifth, it is termed a common chord. Of discords the most simple is the minor seventh, or, as it is usually called, the dominant seventh. The different motions of the parts which constitute harmony may be *parallel*, *direct* (or *similar*), *oblique* and *contrary*. Parallel motion is when two or more parts move in the same direction and remain at the same number of degrees distant; direct or similar motion is when the parts move in the same direction but do not remain at the same distance; oblique motion, either of the parts may be stationary while the rest move in parallel or contrary directions; contrary motion is when the parts approach or recede from each other. It rarely happens that all the parts can move in the same way upwards or downwards together. The rules generally given with respect to the motion and succession of concords are:

1. Octaves and fifths must not be consecutive in parallel motion. 2. Unnecessary and distant skips should be avoided as much as possible, and the chords should be as close and connected as may be. 3. The regular motion of the different parts must be observed; sharp intervals should ascend after the sharp, while flat intervals should descend after the flat. A piece of music harmonized throughout by concords would prove too cloying, and to prevent this discords are introduced. Certain discords are very disagreeable if produced abruptly without preparing the ear to receive them. The preparation of a discord is effected by taking care that the discordant note is heard in the preceding consonance. As the ear would not tolerate a long succession of discords it must be satisfied by a return to concords, which is called the resolution of a discord. This is effected by the part in which the discord appears moving upward or downward to the concordant note in the next chord.

History.—The first public use of music by every people has been in religious rites and ceremonies. The music of the Hebrew worship was of an elaborate character, and was probably derived from Egypt. To the Egyptian priests the Greeks seem also to have owed their ideas of music. It is confidently asserted by some that the Greeks were acquainted with harmony in the technical and musical sense of the word; that the notes A B C D E F G, produced by touching the white keys of the pianoforte, form the common Greek scale; and that their arrangement was copied from the keys of organs, which were derived by us from the Romans through the Greeks, and by the Greeks and Romans from ancient Egypt. The Romans derived all their public music from the Etruscans, and the art was for a long period confined to sacred uses. St. Ambrose (elected Archbishop of Milan 374) may be regarded as the father of the music of the Western Church, as he not only composed and adapted music to the different portions of the church service, but determined the musical idiom in which it was to be cast by selecting a set of simple scales from the exceedingly complicated system of the Greeks. His reputation has, however, been somewhat obscured by the next great musical reformer, Gregory the Great, whose epoch is fully two centuries nearer our own. During this long period the institutions of Ambrose fell into utter confusion, and Gregory, in attempting to restore order, found it necessary to supplement the Ambrosian scales, then first designated *authentic*, by four other subordinate or collateral scales called *plagal*. (See *Gregorian Tones.*) During the four centuries which connect the epoch of Gregory with that of Guido Aretino only two names are worthy of mention—that of Isidore, Archbishop of Seville, in whose *Sententiæ de Musica* we meet, for the first time at least among Christian writers, with the mention of harmony in the modern sense of the term; and that of Hucbald, a monk of St. Armand, Tournay (died 932), who not only mentions harmony, but gives examples of the harmony of his age, *diaphony* or *organum*. The greatest name, however, of the early middle ages is that of Guido Aretino (died 1050). The names which he gave to the notes, *Ut* (for *Do*), *Re*, *Mi*, *Fa*, *Sol*, *La*, are universally used to this day. *Si* was afterwards added by a musician named Le Maire. Within fifty years after the death of Guido a new form of musical art made its appearance, the characteristic of which was the combination of sounds of unequal lengths—music in which two or more sounds succeed one another, while one equal to them in length was sustained. This was called *discantus*, or descant. Descant, it is obvious, would argue the existence of some system of musical proportion among sounds of different duration, and written descant some means of distinguishing such sounds from one another. As might be expected, we hear of both inventions about the same time, the middle of the twelfth century, when the treatise on the *Cantus Mensurabilis* of Franco of Cologne was written, when notes appear first to have been used, and signs to represent the raising and depressing of individual sounds (flats and sharps) first came into being. Late in the thirteenth century we hear of Adam de la Hale, the Hunchback of Arras as he was called, born in 1240, the composer of several three-part songs, and also of the first comic opera, *Li Gieus de Robin et de Marion*. The beginning of the next century furnishes us with a remarkable evidence of musical advancement in the word *contrapunctum* (point against point), or as we now say, note against note. This word was first used in the works of Jean de Muris, the greatest theorist of the fourteenth century. The middle of the century gives us the first example of four-part music, in a mass performed at the coronation of Charles V of France (1360) and composed of Guillaume de Machault. By this time the organ had reached some degree of mechanical perfection, and several Belgian musicians visiting Rome in the last years of the fourteenth century carried

with them the first masses that had ever been seen there in written counterpoint. In the list of these singers (1380) we find the name of Dufay, whose compositions, though harsh in places to our modern ears, are far superior in design and clearness of texture to anything known to be produced by his predecessors. But the works of Dufay and his contemporaries have been cast into the shade by those of a later generation, of the masters of the new Belgian school, Ockenheim, his contemporaries and pupils. Canon, fugue, and imitation, practiced by Dufay, were greatly improved by Ockenheim, among whose pupils was Josquin Deprès, or Des Prez (died in 1521). The works of the latter drove those of every other composer from the churches of the Continent, and he was scarcely less successful in productions of a lighter class. His pupils and countrymen were to be found in every court and important city of the Continent, among the musical schools founded by them being those of Naples and Venice. The Italians, however, soon advanced beyond the limits of the art as taught by the Belgians. Constanzo Festa, whose *Te Deum* has been sung on the election of every pope since his time, was one of the creators of the madrigal; and Giovanni Animuccia is of special interest from his connection with St. Filippo de Neri, to which may be traced the origin of the oratorio. The first Roman school was founded by Claude Gondimel (1510-72), among whose pupils was the greatest composer the world had yet seen, Giovanni Pierluigi Palestrina (1524-94). Musical learning had by this time done its utmost. Every kind of contrapuntal artifice had been brought into play, but no attempt was made to bring out the meaning of the words, and this evil, in conjunction with the frequent use of secular melodies, came under the censure, first of the Council of Basel, and then of the Council of Trent. The committee appointed to carry out the decrees of the latter sought the aid of Palestrina, and his three masses, more particularly the third, the *Missa Papæ Marcelli*, at once saved music to the church, and established a type which is still recognized. At this period great musical skill and knowledge extended over every part of civilized Europe, the Italians being now, as the Belgians had been before, its chief masters and interpreters, except in England, which in this sixteenth century had a strictly national school comprising Tallis, Byrd, Farrant, Morley, Ward, Bull, Dowland, and last and greatest, Orlando Gibbons. The close of the century witnessed the birth of the *Opera seria*. Some faint approaches had been made in this direction before, but about the year 1580 a number of amateurs living in Florence, including Bardi, Corsi, Strozzi, Galileo (the father of the astronomer), and others, formed themselves into a society for promoting the closer union of poetry and music by reviving the musical declamation of the Greeks. Their attempts, however, were soon surpassed by the works of Claudio Monteverde, whose *Orfeo* opened up a new musical world. The first to profit by his discoveries was an artist born some twenty years later—Carissimi, the first great master of the sacred cantata in its various forms. He is said to have been the teacher of Alessandro Scarlatti, the founder of the Neapolitan school. With this school begins modern musical practice; better methods of fingering the keyed instruments, and of bowing the stringed instruments, not to speak of improvements in the instruments themselves; and above all these in importance and difficulty, the art of singing.

The history of the French school proper begins late in the seventeenth century, with J. B. Lully, born in 1633, the composer of many operas, ballets, and occasional pieces, and also of some church music. His music never had great popularity beyond France, but the influence of his example was extensive, and showed itself to some extent in Wise and Blow, and their immediate successors in the English Chapel Royal, the most distinguished of whom was Henry Purcell, the type of English composers. After him Arne, Croft and Green acquired a certain reputation, but an entirely new era was opened by the advent of Handel, who may be said to belong to England rather than Germany. From about the middle of the last century, when the career of J. Sebastian Bach ended, Germany has indisputably held the highest place in music. Gluck, Haydn, Mozart, Emmanuel Bach, and many others, before and after, owe much of the sweetness which they united with German strength to their study of the Italian masters. But in Beethoven, Weber, Spohr and Mendelssohn the traces of southern influence are hidden, and new emotional and poetic elements begin to find their way into music. Much, too, as the French musical drama owed in its origin to the Italians, its consolidation was the work of the Germans. Springing up with Lully, a Florentine, carried a step forward by Rameau, a Frenchman, it was subsequently immensely developed by Gluck and Meyerbeer (Germans), by Cherubini and Rossini (Italians), and by Méhul, Boieldieu, Hérold and Auber (Frenchmen). Against the best works

of the German masters, those of the purely sensuous school, represented by Donizetti, Bellini and Verdi, strove with some success for popularity; but the tide of victory was soon turned away from the south, and the last-named composer in his later works showed the force of the German influence. Of the later German school, claiming as its starting-point Beethoven's *Ninth Symphony*, in which poetry and music form a perfect whole, the chief exponents have been Wagner and Liszt, though with these, as manifesting more or less the same tendencies, must be cited the names of Schubert, Schumann, Mendelssohn, Berlioz, Chopin and Franz. Opinions may differ as to the extent to which this new development anticipates 'the music of the future,' but there can be no doubt as to the beauty and impressiveness of much of the work of these so-called 'tone-poets.' Among the later composers may be noted the names of Gounod, Massenet and Saint-Saens in France, Brahms and Strauss in Germany, Dvorak in Bohemia, Puccini in Italy, Rubinstein and Tschaikowski in Russia, MacDowell in America, and Grieg in Scandinavia. All have given proof of power and originality.

Music of the Spheres. See *Harmony of the Spheres*.

Musk, a substance used in perfumery and medicine, and obtained from several species of deer. (See *Musk-deer.*) A perfume of similar character is also obtained from one or two other animals (see *Musk-rat*); and various animals and plants are noted for emitting a strong musky smell.

Musk-deer, a genus of deer, forming the type of the family Moschidæ, which is essentially distinct from the family of the Cervidæ, or true deers. Their chief habitat is Asia and the

Musk-deer (*Moschus moschiferus*)

islands of the Eastern Archipelago; though one species is found on the west coast of Africa. The typical species of the family is the *Moschus moschiferus*, found chiefly in the elevated tablelands of Central Asia, and particularly of Tibet. These animals attain the size of a young roe-deer, and the upper jaw bears prominent canine teeth. The males alone yield the *musk*, which is secreted by an abdominal gland of about the size of a hen's egg. The Tibet musk is most in repute, that known as Russian or Siberian being inferior in quality. Besides its familiar use as a scent, musk is employed medicinally as an antispasmodic. There are six or seven other species of *Moschus*, two of which, very diminutive, lack the musk gland.

Musk-duck, a species of duck, often erroneously called the Muscovy-duck (*Cairina moschata*), a native of America, and which has been domesticated. It has a musky smell, and is larger and more prolific than the common duck.

Muskegon (mus-kē'gun), county seat of Muskegon County, Michigan, the largest city on the east shore of Lake Michigan. It was formerly a great lumber city but every mill is now gone. An art gallery, library, hospitals, and splendid schools founded and endowed by lumber kings are chief reminders of its past. It has the largest harbor on the Great Lakes, and there are huge hydro-electric power developments on the river near by. Greater Muskegon is made up of three separately governed cities. Aggregate pop. (1920) 46,084.

Musket (mus'ket), a hand-gun with which infantry soldiers were formerly armed. When first introduced, early in the sixteenth century, as a development of the culverin and arquebus, it was discharged by means of a lighted match (hence the name *matchlock* given to it), and was so heavy that it had to be laid across a staff or *rest* to be fired. To make use of it the soldier was required to carry a slow-burning match with him, which was apt to be extinguished in wet weather. The wheel-lock followed (sixteenth century), the chief feature of which was a wheel made to revolve by means of a spring, and to cause sparks by friction against a flint. The next improvement was the flint-lock proper (about 1625), in which sparks were produced by one impact of a piece of flint on the steel above the priming powder. Musketeers were soon introduced into all armies, and in the beginning of the seventeenth century infantry consisted of pikemen and musketeers, and all changes in regard to the relative proportion of the two arms were always in favor of the latter. The flint-lock musket was intro-

duced into the British army towards the end of the seventeenth century. Superseded by the rifle.

Muskingum (mus-kin'gum), a river in the State of Ohio, and falling into the Ohio River at Marietta. It is about 112 miles long, and its course is followed by the Ohio and Erie Canal as far as Zanesville.

Musk-mallow (musk-mal'ō; *Malva moschāta*), a perennial plant, so named from its peculiar musky odor.

Musk-melon (*Cucumis melo*), a delicious variety of melon, named probably from its aromatic flavor. See also *Cantaloupe*.

Muskogee (mus-kō'gē), a city, county seat of Muskogee Co., Oklahoma, on Arkansas River, at junction of Grand and Verdigris River, 135 miles E. N. E. of Oklahoma City, on numerous railroads. It lies in the richest agricultural section of the State, and has in its trade territory lead and zinc fields, coal fields, and oil and gas fields; with large deposits of clay and shale. It has 75 industrial plants and a similar number of wholesale or jobbing houses. It is the home of the U. S. Indian Agency for Five Civilized Tribes, and has several collegiate institutions. Pop. (1910) 25,278; (1920) 30,277.

Musk-ox (*Ovibos moschātus*), an animal intermediate between the ox and sheep. Resembling in general appearance a large goat-like sheep, its body is covered with a coat of tufted hair, brownish in color and of great length. The hair about the neck and shoulders is so thick as to give the animal a 'humped' appearance; on the rest of the body it is very long, smooth and flowing, while interspersed among its fibers is a layer of lighter-colored wool. The musk-ox is active and agile, climbing mountainous places with ease and dexterity. The horns, broad at the base and covering the forehead and crown, curve downwards between the eye and the ear, and then upwards and slightly backwards. The horns of the female are smaller than those of the male, and their bases do not touch. The ears are short, the head large and broad, the muzzle blunted. The average size of the male is that of a small domestic ox. Gregarious in habits, each herd numbers from twenty to thirty members. The female brings forth one calf in May or June. The food consists of grass, lichens, etc. The musk-ox inhabits the Arctic regions of America north of the 60th degree of latitude to the upper extremity of Greenland. The flesh is pleasant to the taste, though it smells strongly of musk, the odor of which is also diffused from the living animal.

Musk-plant, a little yellow-flowered musky-smelling plant of the genus *Mimulus* (*M. moschatus*), a native of Oregon and some other western states and cultivated to some extent in gardens.

Musk-rat (*Fiber zibethicus*), an American rodent allied to the beaver, and the only known species of the genus. It is about the size of a small rabbit, and has a flattened lanceolate tail, covered with small scales and a few scattered hairs. Its toes are separate, and provided with a stiff fringe of hair. In summer it has a smell of musk, which it loses in winter. The odor is due to a whitish fluid deposited in certain glands near the origin of the tail. Of considerable commercial importance on account of its fur, the musk-rat, or *musquash*, as it is frequently called in America, from its Indian name, is taken in large quantities for its skins, large numbers of which are used by furriers. Very common in North America, the musk-rat lives along the margins of streams, in the banks of which it makes its nest. The musk-rats of Europe, or desmans (*Myogălē moschāta* and *M. pyrenaica*), are aquatic insectivorous animals allied to the shrews and moles, having a long flexible nose, and a double row of glands near the tail secreting a substance of a strong musky smell; found in Southern Russia and the Pyrenees. The musk-rat of India (*Sorex Indians* or *myosūrus*) is a kind of shrew the size of the common rat.

Musk-tree, MUSK-WOOD, the names of trees and wood that smell strongly of musk. The musk-wood of Guiana and the West Indies is *Guarea trichilioides;* the musk-tree of Tasmania, *Eurybia argyrophylla.*

Muslin (mus'lin), a fine thin cotton fabric, first made at Mosul or Moussul (whence the name), afterwards in India, and first imported into England about 1670. About twenty years afterwards it was manufactured in considerable quantities both in France and Britain, and there are now many different kinds made, as *book, mull, jaconet, leno, foundation*, etc. Some Indian muslins are of extraordinary fineness, but they can all be rivaled in Europe. *Figured muslins* are wrought in the loom to imitate *tamboured* muslins, or muslins embroidered by hand.

Muspelheim (mus'pel-hīm), in the Scandinavian mythology, the southern part of the universe and the abode of fire, whence sparks were collected to make the stars. At the oppo-

site pole to Muspelheim is Nifiheim, where all is frozen, cold and dark.

Muspratt (mus'prat), JAMES SHERIDAN, an English chemist, born in 1821; died in 1871. He studied chemistry under Thomas Graham, both at Glasgow and in London, and afterwards under Liebig at Giessen, in Germany, where he remained several years. In 1850 he established a college of chemistry at Liverpool. His chief work was a *Dictionary of Chemistry*, but he was also the author of various contributions to scientific journals.

Musquash (mus'kwosh), a name for the musk-rat.

Musschenbroek (mus'*h* en-brök), PIETER VAN, a Dutch natural philosopher, born at Leyden in 1692. He held professorial chairs successively at Duisburg, Utrecht and Leyden, where he died in 1761. He visited England, became acquainted with Newton, and was made a fellow of the Royal Society. His principal works are *Elementa Physica*, *Tentamina Experimentorum*, *Institutiones Physicæ* and *Compendium Physicæ Experimentalis*.

Mussel (mus'el), a term popularly given to several lamellibranchiate molluscs, section Asiphonida, or those in which 'siphons,' or tubes admitting water to the gills, are absent. The common mussel (*Mytilus edūlus*) forms a typical example of the family Mytilidæ, the shells of which family are equivalve, and have a hinge destitute of teeth. It has a 'beard,' and is the same as the salt-water mussel of New England. The mussel is extensively employed in Scotland as a bait by deep-sea fishermen; and in some districts it is used as an article of food, the best mussels approaching nearly to the oyster in flavor, though occasionally found to be unwholesome. It is cultivated as an article of diet on the European continent, the 'mussel-farms' of the Bay of Aiguillon, near Rochelle in France, forming the most notable example. The family Unionidæ includes the fresh-water or river mussels (*Unio*) and the swan or pond mussels (*Anodon*). The Unionidæ inhabit fresh water exclusively. The pond mussels, of which many species are known, are found in the rivers and lakes both of Europe and America. The hinges of the shell in the genus *Anodon* are destitute of teeth, in the genus *Unio* toothed. The *Unio littorālis* is a familiar species. The *Union margaritifĕrus*, or pearl-mussel, has attained a reputation from the fact that it has yielded pearls to a considerable value in the Don, Tay, Doon, Forth, Spey, and other British streams.

Musselburgh (mus'el-bur-ō), a burgh of Scotland, in Midlothian, 6 miles east of Edinburgh, on the Firth of Forth, at the mouth of the Esk, which divides it into two parts, ancient Musselburgh and Fisherrow. It has a bridge, believed to be of Roman erection; and a curious old tolbooth, not now used as a jail. The battle of Pinkie, in 1547, was fought in the vicinity. Pop. 11,711.

Musset (mū-sā), LOUIS CHARLES ALFRED DE, a French poet, novelist and dramatist, born at Paris in 1810; died there in 1857. After trying various professions he gave himself up wholly to literature, and in 1829 published a volume of poems called *Contes d'Espagne et d'Italie*, which had an immediate and striking success. In 1831 appeared *Poésies Diverses*, and in 1833 *Un Spectacle dans un Fauteuil*, in which the two chief pieces are a comedy of a light and delicate grace called *A quoi Rêvent les Jeunes Filles*, and a poem entitled *Namouna*, written after the manner of Byron. In 1833 he traveled in George Sand's company, but their intimacy soon came to an end. In 1836 was published his *Confession d'un Enfant du Siècle*, a gloomy novel, containing the analysis of a diseased state of mind, all the phases of which the author had studied in himself. The same settled melancholy also distinguishes his *Rolla*, *Une Bonne Fortune*, *Lucie*, *Les Nuits*, *Une Lettre à Lamartine*, *Stances à Madame Malibran*, *L'Espoir en Dieu*, and other poems. Among his light and sparkling dramatic pieces are: *On ne badine pas avec l'Amour*, *Les Caprices de Marianne*, *Il ne faut pas jurer de Rien*, etc. In 1848 Musset was deprived by the revolution of the situation of librarian to the ministry of the interior, a sinecure which he had obtained through the favor of the Duke of Orleans; but he was restored to this post under the empire, and was in addition appointed reader to the empress. In 1852 he was admitted a member of the French Academy. De Musset was one of the most distinctive, and, in a certain sense, original of modern French writers. At a time when the battle between the Classicists and Romanticists was at its height he took sides with neither, but made for himself a style combining the excellences of the two schools. His elder brother, Paul, was also a writer of some ability, but always overshadowed by the brilliance of Louis.

Mussulman. See *Moslem*.

Must, the juice of the grape, which by fermentation is converted into wine.

Mustang (mus'tang), a small wild horse of the Southwestern United States and Northern Mexico, where it is found in extensive herds, and is captured and tamed as the Indian pony. A reversion from the domesticated stock, it seldom exceeds 13 hands in height, but is a strong and useful animal, capable of great endurance.

Mustard (mus'tard), the common name of plants of the genus *Brassica*, nat. order Cruciferæ. The seeds of the *B. alba* and *B. nigra* (white and

Mustard (*Sinapis nigra*).

black mustard), when ground and freed from husks, form the well-known condiment called mustard. The plant is an annual, with stems 3 to 4 feet in height, lower leaves lyrate, upper lanceolate and entire flowers small and yellow. The preparation from the seeds is often very valuable as a stimulant to weak digestion, and as an adjunct to fatty and other indigestible articles of food. When mixed with warm water and taken in large quantities it acts as an emetic. The tender leaves are used as a salad, and the seeds of *B. nigra* are used in the well-known form of poultice, being applied to various parts of the skin as a rubefacient. *Wild mustard* or *charlock* (*B. arvenis*) is a troublesome weed which grows in all kinds of grain crops sown in the spring. It is a common impurity of grass and clover seeds. It may be controlled by the use of iron sulphate or copper sulphate spray.—*Oil of mustard* is an essential oil obtained from the seeds of *B. nigra*. It is very pungent to the taste and smell, and when applied to the skin speedily raises a blister.

Mustela (mus-tē'la), the weasel genus of carnivorous animals.

Muster (mus'tèr), in a military sense, a review of troops under arms, to see if they be complete and in good order, to take an account of their numbers, the condition they are in, their arms and accouterments, etc.

Muster-roll, a list of the officers and men in every regiment, troop, or company of soldiers.

Musulman. See *Moslem*.

Mutiny (mū'ti-ni) is the unlawful insurrection or revolt of soldiers or seamen against the authority of their commanders; open resistance of officers or opposition to their authority. A mutiny is properly the act of numbers; but by statutes and ordinances for governing the army and navy the acts which constitute mutiny are multiplied and defined; and acts of individuals, amounting to resistance of lawful commands of officers, are declared mutiny. Officers beginning or joining mutiny are guilty of the offense. Mutiny is punishable in the navy by fine or imprisonment, or both; in the army it is punishable by death or such other punishment as a court-martial shall direct.

Mutsuhito (mötz-u-hē'to), former emperor or mikado of Japan, was born in 1852, and succeeded to the throne in 1867, marrying the Princess Haruko in 1869. His reign was marked by great reforms, among them the suppression of the feudal organization of the nobility, which so long impeded the political progress of the country. Others were the giving Japan a representative system of government and adopting the institutions of Western civilization. Under his reign Japan made remarkable progress, which not only placed it foremost among Asiatic nations, but ranked it among the great powers of the world. This was the result of successful wars waged against China and Russia. Mutsuhito proved himself an able and progressive ruler. He died in 1912, and was succeeded by his son Yoshihito, who was born in 1879.

Muttra (mut'tra), a town in India, capital of Muttra district, on the Jumma, 36 miles northwest of Agra. It is an old Hindu city, one of the most artistic and interesting in India, and being regarded as the birthplace of Krishna is a great center of Hindu devotion and place of pilgrimage. Pop. 60,042.

Mutule (mū'tūl), an ornament in Doric architecture, corresponding to the modillion in the Corinthian and Composite orders, and consisting of a projecting block in the cornice immediately under the corona and perpendicularly above the triglyph. It is often made to slope downwards towards the front,

and usually has guttæ or drops underneath.

Muzaffarnagar (mö-zuf'fur-nag-ur), a town of India, 70 miles N. N. W. of Delhi; chief town of district of same name. Pop. 23,444.

Muzaffer-ed-Din, shah of Persia, born in 1853, son of Nasr-ad-Din. He succeeded in 1896, on the death of his father by assassination and died in 1902.

Muziano (mŏt-se-ä'nō), Girolamo, Italian painter, born near Brescia in 1528. After studying the art of Titian he repaired to Rome about 1550, where he soon attracted attention by his landscapes. Subsequently he became an imitator of the style of Michael Angelo, and his picture of the *Raising of Lazarus* at once established his fame. He also made great improvements in mosaic work. The handsome fortune gained by his talents and industry he devoted in part to assisting to found the Academy of St. Luke at Rome. Died 1590 or 1592. Many of his works are to be met with in Rome.

Muzo (mŏ'sō), a village in the state of Colombia, South America, N. W. of Bogota, noted for its rich mine of emeralds.

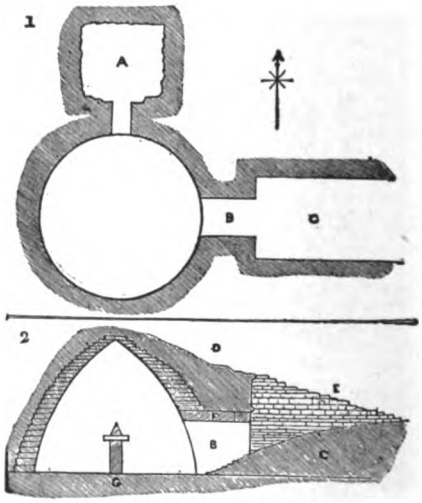
Mycelium (mī-sē'li-um), the cellular filamentous structure of fungi. Mycelium consists of whitish anastomosing filaments which spread like a network through the substances on which the fungi grow. In the cells of the mycelium reproductive spores are developed.

Mycenæ (mī-sē'nē), an ancient city of Argolis, in the Peloponnesus, about 6 miles northeast of Argos. It is said to have been founded by Perseus, and before the Trojan war to have been the residence of Agamemnon, in whose reign it was regarded as the leading city in Greece. Its ruins are extremely interesting from their antiquity and grandeur. Among them are the Lion's Gate, and the vaulted building of enormous stones called the *Treasury of Atreus*, etc. Dr. Schliemann carried out excavations here with valuable and interesting results.

Mycŏni (mik'o-nē; anciently *Myconos*), an island in the Grecian Archipelago, one of the Cyclades, about 21 miles in circuit. The inhabitants are chiefly employed in seafaring pursuits. The capital, Mycŏni, a seaport, contains about 3400 inhabitants. The island produces barley, raisins, and figs, with some wine. Pop. 4466.

Myelitis (mī-e-lī'tis; from the Greek *myelos*, marrow), in medicine, inflammation of the substance of the spinal marrow.

Myers (mī-erz), Frederick W. H., an English physicist, born in 1843. He became an active member and secretary of the Society for Psychical Research, and published *Essays Modern and Classical, Science and a Future Life*, and, in collaboration, *Phantasms of the Living*. His most important work is *Human Personality and its Survival of Bodily Death*, a critical review of the spiritualistic hypothesis. He died in 1901.



Treasury of Atreus, Mycenæ.

1, Plan.—A, Rock-cut Chamber. B, Doorway. C, Approach. 2.—Section C, Approach filled with earth. D, Slope of hill. E, Wall on north side. F, Lintel. G, Door to A.

Mygale (mig'-al), a genus of spiders, the type of the family Mygalidæ, furnished with four pulmonary sacs and spiracles, four spinnerets, eight eyes, and hairy legs. Their nests, constructed of silk, are built in clefts of rock, trees, etc., and in the ground. The bird catching spider of Surinam belongs to this species; other larger species frequently prey on small vertebrate animals, not by laying toils for them, but by regularly hunting them. They envelop their eggs in a kind of cocoon.

Mylabris (mi-lab'ris), a genus of coleopterous insects nearly allied to the Cantharides (which see), noteworthy because of the use made of some species as a blister-fly.

Mylitta (mi-lit'ta), an Assyrian goddess, identified by the Greeks

with Aphroditē. She was, as goddess of the moon, the female principle of generation.

Mylodon (mil'ō-don), a genus of extinct edentate mammalia, allied to the megatherium. Its remains have been found in the upper tertiaries of South America. In size the *Mylodon robustus*—the most familiar species—attained a length in some instances of 11 feet. Of terrestrial habits, the mylodon

Skeleton of Mylodon.

obtained the vegetable food upon which it subsisted chiefly by uprooting trees. The genus ranged into North America, remains of one species (*M. harlani*) having been found in the United States.

Myograph (mī'-ō-graf), an instrument for recording contractions and relaxations of the muscles. Several forms have been devised, that of M. Laulanie being styled myoscope.

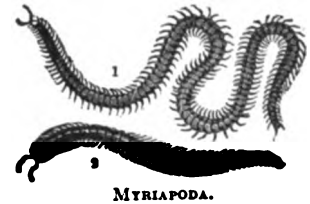
Myology (mī-ol'-ō-ji; Greek, *mys*, muscle, and *logos*, science), the term applied distinctively in anatomical and physiological science to the description of the muscular system both in its structural and functional aspects.

Myopia (mī-ō'pi-a), the scientific name for short-sightedness. See *Sight, Defects of.*

Myosotis (mī-o-sō'tēz), a genus of plants belonging to the Boraginaceæ, and comprising numerous European and Northern Asiatic, a few North American, and three of four Australian species. The *M. palustris* is the well-known forget-me-not. Other species are popularly known as scorpion-grass.

Myoxus (mī-oks'us), the dormouse genus of animals.

Myriapoda (mir-i-ap'o-da; *myrioi*, ten thousand, and *pous, podos*, foot), the lowest class of the higher annulose or anthropodous animals, represented by the centipedes, millepedes, and their allies, and resembling the Annelids in the lengthened form and the numerous segments of the body, each segment being provided with one pair of ambulatory feet, whence the name. They have a distinct



Myriapoda.

1, *Geophilus sefeborii*, one of the Chilopoda.
2, *Iulus plicatus*, one of the Chilognatha.

head, but no division of the body into thorax and abdomen, as in insects. They are therefore of a lower structural type than insects, which in general organization they resemble. No wings are developed. They respire through minute spiracles or pores along the whole length of the body, and are invested with a hard chitinous or horny covering or exoskeleton. This class is divided into two orders, the Chilognatha or Diplopoda, in which the fusion of two rings gives apparently two pairs of feet on each ring; and the Chilopoda, which have two pairs of foot-jaws or maxillipeds, and not more than one pair of feet on each segment.

Myristica (mir-is'ti-ka), the only genus of the nat. order Myristicaceæ. *M. fragrans*, a native of the Moluccas, yields the nutmeg of the shops. Other species bear fruit that may be employed as a substitute for nutmeg.

Myrmecoph'aga. See *Ant-eater.*

Myrme'leon. See *Ant-lion.*

Myrmidons (mir'mi-donz), an anorent Greek people of Thessaly, who accompanied Achilles to the Trojan war. They are said to have emigrated into Thessaly under the leadership of Peleus. The term has come to signify the followers of a daring and unscrupulous leader, or the harsh and unfeeling agents of a tyrannical power.

Myrobalan (mī-rob'a-lan), a dried fruit of various species of trees, brought from the East Indies, all slightly purgative and astringent. Mirobalans are used by the Hindus in calico printing and medicine, and imported into United States for dyers and tanners, especially the latter. They are the produce of several species of Terminalia (order Combretaceæ), the chief of which are the belleric myrobalan (*T. Bellerica*) and

the chebulic (*T. Chebulica*). Written also *Myrobolan, Myrobolam*, etc.

Myron (mī'ron), one of the chief sculptors of the older Attic school, who flourished in the middle of the fifth century B.C. The famous *Discobolus*, or *Quoit Player*, is the only certainly known work of his a copy of which has come down to our time.

Myrrh (mer), a plant. See *Chervil.*

Myrrh, is the name given to a gum resin which exudes from a shrub growing in Arabia and Abyssinia, called *Balsamodendron Myrrha*. It was much esteemed as an unguent and perfume by the ancients, who used it also for embalming and for incense. It is still used as a perfume and for incense, as also medicinally. By distillation with water myrrh yields a viscid, brownish-green, volatile oil. Myrrh of the best quality is

Myrrh (*Balsamodendron Myrrha*).

known as Turkey myrrh; that of an inferior kind goes under the name of East Indian, being exported from Bombay.

Myrtaceæ (mir-tā'se-ē), the myrtle tribe, an extensive and important nat. order of polypetalous exogens, mostly inhabiting warm couuntries, and in all cases either shrubs or trees. They have simple entire leaves, often dotted with resinous pellucid glands and regular, axillary and solitary, or spiked, corymbose, or panicled white, pink, or yellow (never blue) flowers, with numerous stamens. Some yield useful products, such as guavas, cloves, pimento, Brazil-nuts, and cajeput oil. The eucalypts or gum-trees are characteristic of Australia.

Myrtle (mer'tl; *Myrtus*), a genus of plants, nat. order Myrtaceæ, consisting of aromatic trees or shrubs, with simple opposite leaves sprinkled with pellucid glandular points, and having axillary or terminal white or rose-colored flowers. One species, the common myrtle, is a native of the south of Europe and other countries bordering on the Mediterranean. It has been celebrated from remote antiquity on account of its fragrance and the beauty of its evergreen foliage, and by different nations was consecrated to various religious purposes. The brows of bloodless victors were adorned with myrtle wreaths, and at Athens it was an emblem of civic authority. With the moderns it has always been a favorite ornamental plant. It flourishes in the open air only in warm countries. The seeds of several species, as the small-leaved myrtle of Peru, the limia myrtle of Chile, and some others, are palatable and eaten by the people.

Myrtle Wax. See *Candleberry.*

Mysia (mis'i-a), in ancient times the name applied to a district in the northwest of Asia Minor, which varied greatly in extent at different periods.

Mysis (mī'sis), the opossum shrimps, a genus of crustaceans belonging to the order Stomapoda. They are the chief crustaceans of the Arctic Ocean, and constitute the principal food of the whalebone whale.

Mysole (mī-sōl'), an island in the Indian Archipelago, between Ceram and the northwest extremity of New Guinea. It is about 50 miles long by 15 miles broad, and is inhabited by immigrant Malays and by Papuans. Trepang, ambergris, birds of paradise, pearls, etc., are exported.

Mysor (mī-sōr'), or MYSORE, a principality of Southern India; area, 27,936 square miles. It is inclosed east and west by the Eastern and Western Ghauts, and on the south by the Nilgiri Hills, and consists of table-lands about 2000 feet above the level of the sea. The only river of importance is the Kaveri. There are many large tanks and artificial reservoirs used for irrigation, and the soil produces all the grains and vegetables of the other parts of India and many of the fruits of Europe. Coffee and silk are largely produced, and there are valuable forests. Silk and cotton manufactures are carried on, and there are manufactures of cutlery, copper vessels, and gold and silver lace. Mysor is the capital. Bangalor is the British headquarters. The revenue and expenditure of the principality are somewhat over £1,000,000. The ruinous misgovernment of the native prince whom the British had set up in Mysor caused his deposition in 1831. The territory continued under British administration till 1881, when it was handed over to a na-

tive maharajah educated under the care of the British. Pop. 5,539,399.

Mysor, the capital of the state of the same name, 250 miles west by south of Madras, stands at an elevation of 2450 feet above the level of the sea. The streets are regular, and the houses intermingled with trees and temples. The fort, separated from the town by an esplanade, is built in the European style. It contains the rajah's palace (which boasts a magnificent chair or throne of gold) and the dwellings of the principal merchants and bankers, and other private edifices. To the south of the fort and about 5 miles from the city is Mysor Hill, on the summit of which is the British residency. The leading industry is carpet-weaving. Pop. (1910) 71,300.

Mysteries (mis'ter-iz), a kind of rude dramas which were a favorite spectacle in the middle ages, represented at solemn festivals. The subjects were of a religious character, and the ecclesiastics were at first the performers and authors, the performance being in church. Such plays were called *mysteries* because they taught the mysterious doctrines of Christianity, and the mysteries proper represented scenes from Scripture history, being thus distinct from the *miracle* plays which dealt with lives of saints, though the distinction is not always attended to. These plays were usually exhibited in a connected series by the guilds or trades of a town. They sometimes took several days to perform. Thus we hear of one which lasted eight days, and contained the greater part of the Scripture history, beginning with the creation and ending with the judgment day. The *Passion of Christ*, the *Slaughter of the Innocents*, etc., were among the subjects represented, the first perhaps more frequently than any other. Corpus Christi day was the chief occasion on which they were performed, and they continued from the twelfth to the sixteenth century. Such plays are still performed at various places in Roman Catholic countries. The passion-play performed at the village of Oberammergau, in Bavaria, every ten years, is a play of this kind. The mysteries were superseded by the moralities (which see).

Mysteries, among the ancient Greeks, and afterwards also among the Romans, secret religious assemblies which no uninitiated person was permitted to approach. They originated at a very early period, and seem to have had a double object—first, that of handing down the traditions relating to the divinities in whose honor they were celebrated; and secondly, that of teaching and practicing religious rites. The most important Greek Mysteries were—1, The Eleusinian (see *Eleusis*). 2, The Samothracian, celebrated in honor of the Cabiri (see *Cabiri*). 3, The Dionysia, which were celebrated in honor of Bacchus or Dionysius. These were of so licentious a character that they were finally forbidden as prejudicial to the public peace and morals. This was likewise done in Italy by a decree of the Roman Senate in 166 B.C. 4, Orphic, founded by some who called themselves followers of Orpheus.

Mysticism (mis'ti-sizm), a word of very vague signification, applied sometimes to views or tendencies in religion which aspire towards a more direct communication between man and his Maker through the inward perception of the mind, than that which is afforded through revelation, or to efforts or inclinations by some special and extraordinary means to hold intercourse with divine powers or the inhabitants of higher worlds. According to John Stuart Mill, 'whether in the Vedas, in the Platonists, or in the Hegelians, *mysticism* is neither more nor less than ascribing objective existence to the subjective creations of our own faculties, to ideas or feelings of the mind, and believing that, by watching and contemplating these ideas of its own making, it can read in them what takes place in the world without.' The tendency towards mysticism seems naturally implanted in some natures, and has been observed in all ages. It is a characteristic feature of the great Asiatic religions, Brahmanism and Buddhism. In the Neo-Platonic philosophy it is an important element, as represented by Plotinus (204-269 A.D.). Christianity, in consequence of its special tendency to practical good, as well as of its submission to a system of doctrine expressly revealed, would seem to have afforded little scope for the extravagances of mysticism. It soon, however, made its appearance, forming a kind of profane mixture, and reached its extreme in the writings of the so-called Dionysius the Areopagite. This pseudo-Dionysius obtained an extensive influence, especially through Hugo St. Victor, in the twelfth century, and was everywhere held in high respect until the time of the Reformation. In opposition to scholasticism, which labored in the construction of a systematic and almost demonstrative theology, this system embodied a theology of feeling and immediate illumination, which attached very little importance to intellectual effort, and laid so much the more weight on purification of heart and ascetic morality. Of the most notable of the German mysticists in the middle ages were Eckhart and

Tauler. In the philosophy of the fifteenth and sixteenth centuries, in Paracelsus. Bruno, and others, mysticism took a direction which at a later period gave rise, on the one side, to the alchemists and Rosicrucians, and on the other side to a number of religious sects, of which such men as Jacob Böhmen and Swedenborg may be considered the representatives. The Quietism of Madame Guyon and her adherents (such as Fénelon) in France in the eighteenth century was a product of the same nature.

Mytens (mi'tens), DANIEL, a Dutch portrait painter, born at The Hague about 1590. He came to England in the reign of James I, and was named painter to Charles I. But after several years' enjoyment of royal and aristocratic favor he declined before the rising star of Vandyke and returned to Holland. Many of his portraits are at Hampton Court.

Mythology (mi-thol'o-ji; Greek, *mythos*, a tale or fable, and *logos*, a discourse), the collective name for the whole body of fables, legends, or traditions (myths) that take their rise at an early period of a nation's existence and of its civilization, and that embody the convictions of the people among whom such fables arise as to their gods or other divine personages, their origin and early history and the heroes connected with it, the origin of the world, etc. Such fabulous narratives seem to grow up naturally among all early peoples, and are found among the ruder races at the present day; but the mythologies which have been most studied, and the tales belonging to which are best known, are those of ancient Greece and Rome, Scandinavia, the Hindus, and ancient Egypt. Though speculations as to the origin of mythology have been put forth from a very early period, it is only in recent times, by the help of comparative philology, and by comparing together the myths of different peoples (comparative mythology), that any real advance has been made. Myths are of course believed in by the bulk of the people among whom they are current, and it is only when speculative and reflective spirits arise, and when science and philosophy have made some advances, that their truth is called in question. Thus Zeus, Apollo, Athēnē, Heracles, and the other divinities of ancient Greece, were believed by the bulk of the people to have a real existence, and the stories regarding them were looked upon as true; but even in Greece in early times the absurdities and monstrosities of some of the myths attracted the attention of philosophers, and led to attempts at explaining the stories in such a way as that they should not shock common sense or moral feeling. In doing this three chief systems of interpretation were followed, called respectively by Max Müller the *ethical*, the *physical*, and the *historical*. Those who adopted the first explained that the stories of the power and omniscience of the gods, of their rewarding good and punishing evil, were invented by wise men for the purpose of maintaining law and order in communities—leaving it to be supposed that the immoral representations of the gods were the inventions of poets. The interpreters of the physical (also called the *allegorical*) school held that the myths contained explanations of natural phenomena, or of certain views regarding them, under a peculiar phraseology, which disclosed its hidden wisdom when rightly understood. The third or historical school, identified with the name of Euhemerus, represented the gods as having been originally kings or chiefs, great warriors, sages, or benefactors of the human race, who, being exalted above their fellowmen in life, after their death gradually came to be looked upon as deities.

Perhaps the most common theory of mythology at the present day is one that is based upon comparative philology, and on a comparison of the myths of the different Indo-European nations, and finds its chief exponents and supporters in Max Müller and Sir George W. Cox. It maintains that all myths have their origin in physical phenomena; but it differs from the older physical or allegorical school in explaining myths as an unconscious product of the popular mind, whereas an allegory (such as the older physical school represented myths to be) is a conscious product of some individual mind. The exponents of this school tell us that in order to understand how myths grow up naturally we must carry our thoughts backwards to an early stage of language and civilization, when men have little or no real knowledge of the external world, when they use themselves as the gauge of all phenomena, and endow every object of sense with a conscious life similar to their own, applying to inanimate objects the language which they use when speaking of their own feelings or actions. Thus in early times men would speak quite naturally of the sun as the child of the night, as the destroyer of the darkness, as the lover of the dawn and as deserting her, as traveling over many lands, as the child of the morning, as her husband, as her destroyer, and so on. This language was

natural in early times, and was perfectly understood as descriptive simply of natural phenomena, and nothing else; but in course of time such expressions lost their natural significance, and in this way it was explained that Phœbus Apollo, Endymion and Phaëthon, for instance, all originally significant epithets applied to the sun from his brilliancy or other characteristic, became the names of divinities, who were regarded as quite distinct from each other. So Zeus originally meant the sky, Athēnē and Daphnē the dawn, Hermes the wind, and so on. According to this theory the story of Apollo slaying the children of Niobē with his arrows is nothing more than a mythological way of telling how the morning clouds are dispersed before the rays of the rising sun. Heracles or Hercules, again, is the sun laboring throughout his life for the benefit of others; soon after birth he strangles the serpents of darkness, and after performing innumerable toils he dies on the funeral pyre, as the sun sinks in the fiery west. Endymion, as his name implies, is the setting sun, who is courted by the moon, and who sinks to sleep in the west. Some of these identifications of deities with natural phenomena are pretty certain. Zeus, for instance, the supreme god of Greece, the same as the Jupiter of the Romans and the Dyaus of the early Hindus, is clearly the bright sky and among the Hindus the name of the sky-god Dyaus always retained its meaning of sky, so that Dyaus had only an indistinct personality as a deity. The Hindu Varuna, a sky-god, is clearly the same as the Greek Ouranos, which latter word, besides being the name of a deity, had the ordinary signification of sky or heaven. So the Scandinavian Thor, the god of thunder, can hardly be anything else than thunder personified. Yet as a whole the 'solar theory' cannot be accepted as a key to all mythology. It fails to account for many of the wild and monstrous myths told of deities, of the creation of the world, of the state of the dead, etc., and though it may throw a certain amount of light on the mythology of the Aryan or Indo-European nations, it is quite insufficient when myths as a whole are investigated.

Another road, therefore, has been taken by some recent investigators. Thus Mr. Andrew Lang finds a key to mythology in a study of the myths and mental habits of savage races; he maintains that 'the savage and senseless element in mythology is for the most part a legacy from ancestors of the civilized races who were in an intellectual state not higher than that of Australian Bushmen, Red Indians, the lower races of South America, and other worse than barbaric peoples,' and that the monstrous myths current in Greece, Egypt and India were thus inherited. He points to the currency of such myths among savages at the present day, and to the fact that in general savages are eager to arrive at some explanation of the natural phenomena around them, and are quite satisfied with explanations that to civilized men may seem even imbecile. When a phenomenon presents itself the savage requires an explanation, and this he makes for himself, or receives from tradition, in the shape of a *myth*. But the fact is that no one theory can be expected to explain the origin of all myths, and it is impossible to deny that while some may be pure products of imagination, tales invented by early bards or minstrels to beguile a weary hour, in others fragments of real history may be hidden.

Mytilene, or MITYLENE (mit-i-lē'nē), a town in the island of Lesbos. See *Lesbos*.

Myxœdema (mik-sē-dē'ma), the name generally accepted for a diseased condition due to loss of function of the thyroid gland, occurring in adults, generally women, characterized by a thickening of the subcutaneous tissue, most noticeable in the face (which becomes swollen and expressionless) and the hands, with a simultaneous dulling of all the faculties and slowing of the movements of the body. Myxœdema is very slow in its progress. In 1890–91 Horsley and others treated cases successfully by grafting in the thyroid gland of a calf, or by injecting the juice of animal thyroids. Since then remarkable success has been attained by giving the patients calves' thyroids to eat, or administering the extract by the mouth.

Myxomycetes (mik-sō-mi-sē'tēz), a class of very simple cryptogamic plants known as thallophytes. They live on damp surfaces exposed to air, especially on rotting wood, and feed on organic débris. They form composite masses or plasmodia, in which numerous units are fused, or in rare cases simply combined in close contact. On the margins of such a mass amœboid processes of living matter flow in and out, with streaming internal movement, and the plasmodium spreads towards moistur food and warmth, or away from the ligh

N

N, the fourteenth letter and eleventh consonant of the English alphabet; formed by placing the point of the tongue against the root of the upper teeth and forcing out the breath. It is classed as a nasal, a lingual, and liquid or semivowel. In English and most other languages *n* has a pure nasal sound; in French and Portuguese, after a vowel in the same syllable, as *on*, *un*, etc., it has the effect of giving a seminasal sound to the vowel preceding, that is to say, the vowel is sounded by an emission of the breath partly through the nose and partly through the mouth. The Spanish alphabet has a character ñ, called *n* with the *tilde*, as in *España*, pronounced like *ni* in *onion*, *minion*; *gn* in Italian is pronounced in the same way.

Naas (näs), a town in Ireland, County Kildare, 17 miles southwest of Dublin, an ancient place, once the residence of the kings of Leinster. Pop. 3836.

Nabathæans (na-ba-thē'anz), a Semitic race of people who from the fourth century B.C. to about 100 A.D. held a position of importance in Arabia Petræa and the adjacent regions. They were ruled by kings; their capital was Petra, and they carried on a great caravan trade.

Nábha (näb'ha), one of the Punjab native states of India, having an area of 966 square miles, with a population of 297,949. The chief town is Nábha, which has a pop. of 18,468.

Nabis (nā'bis), a Spartan who succeeded in making himself king of Sparta in B.C. 207, and reigned with great tyranny and cruelty. He was defeated by Philopœmen at the head of the army of the Achæan League, and was at last killed in Sparta by his own allies, the Ætolians, whom he had called in to his assistance (192 B.C.).

Nablus (nä-blös'), or NABULUS, a town of Palestine, capital of Samaria, 30 miles north of Jerusalem. It is beautifully situated among gardens, orchards and fertile fields, along the base of Mount Gerizim. It is the principal residence of the descendants of the ancient Samaritans, and has some manufactures and a considerable trade. The chief objects of attraction to pilgrims are the tombs of Joshua and Joseph, and Jacob's Well, 3 miles south, on the road to Jerusalem. Pop. estimated at 25,000.

Nabob (nā'bob; a corruption of *nawab*, the plural of *naib*, a deputy), in India, formerly the title of a governor of a province or the commander of the troops; borne, however, by many persons as a mere titular appendage.

Nabonassar (nab-o-nas'ar), a king of Babylon, with whose reign begins an epoch called the *Era of Nabonassar*. It began on February 26, 747 or 746 B.C.

Nacre. See *Mother-of-pearl*.

Nadir (nā'dir), in astronomy, that point of the heavens which is diametrically opposite to the zenith, or point directly over our heads. The zenith and nadir are the two poles of the horizon.

Nadir Shah (nā'dēr shâ), King of Persia, a famous conqueror and usurper, was born in 1688. Having distinguished himself against the Afghans and Turks he acquired the chief power in Persia in 1732, seized the shah, confined and deposed him, and proclaiming his son Abbas, then an infant, in his stead, assumed the title of regent. The young king dying in 1736, Nadir seated himself on the throne as shah. Being invited by some conspirators about the person of the Great Mogul to undertake the conquest of India, he began his march at the head of 120,000 men, and with little resistance reached Delhi in March, 1739. Being exasperated by some tumults on the part of the inhabitants he caused a general massacre, in which upwards of 100,000 persons perished. After this barbarity the victor concluded a peace with the Mogul, whose daughter he married, receiving with her, as a dowry, some of the finest provinces of his empire contiguous to Persia. In this expedition it is supposed that he carried away, and distributed among his officers, valuables to the amount of $500,000,000

On his return he waged war with equal success against neighboring princes, and at the height of his power his dominions stretched from the Indus and the Oxus to the Euphrates and the Caspian. A conspiracy having been formed against him by the commander of his bodyguard and his own nephew, he was assassinated in his tent in 1747, his nephew, Ali Kuli, succeeding to the throne.

Nadiyá (nad'ē-yä), or NUDDEA, a district in the lieutenant-governorship of Bengal, with an area of 2793 square miles. The Padma or Ganges flows along its northeastern boundary, and other offshots of the great river skirt or flow through the district. Pop. 1,667,491. The chief town is Nadiyá, on the Bhagirathi, a place of sanctity, and seat of indigenous Sanskrit schools. Pop. 10,880.

Naefels (nä'fels), a village in the canton of Glarus, Switzerland, a few miles north of the capital (Glarus), the scene of one of the most famous of Swiss battles, when 1500 men of Glarus defeated a force of from 6000 to 8000 Austrians (1388). Pop. 2525.

Nævius (nē'vi-us), CNEIUS, an early Roman poet, born in Campania between 274 and 264 B.C. He wrote tragedies and comedies after the model of the Greek, and an epic poem upon the Punic war. By the introduction of some of the Roman nobility into his comedies he provoked their anger, was banished from the city, and retired to Utica. He died B.C. 204 or 202. Fragments only of his works have come down to us.

Nævus (nē'vus), or 'MOTHER'S MARK,' a disfigurement which occurs most frequently on the head and trunk, but may also appear on the extremities. It consists essentially of an enlargement of the minute veins, or venous capillaries, which are dilated, and anastomose or unite among themselves to form a vascular patch generally of a deep-red color. The familiar name of 'mother's mark,' or 'longing mark,' is applied from the popular belief that the lesion was the result of fear, fright, unnatural longing, or some such irritation acting upon the mother's constitution, and communicating its effects to the unborn child in the shape of this mark.

Naga Hills (nä'gä), a district of Assam. Area 3070 square miles. It consists largely of unexplored mountain and jungle. The tribes are very unruly, and numerous outrages have called for the intervention of the British government. Pop. 102,402.

Nágapatnam. See *Negapatam.*

Nagasaki (nä'ga-sä'kē), or NANGASA'KI, a city and port in Japan, on the west coast of the island of Kiusiu, beautifully situated on a peninsula at the extremity of a harbor, affording excellent anchorage, and inclosed by hills, up the sides of which a portion

of the town extends. Nagasaki was one of five Japanese ports opened in 1858 to the British and Americans, having been previously open to the Dutch; and in 1869 it and seven others were opened to foreign nations generally. The exports are copper, silk, camphor, tobacco, porcelain, lacquered wares, etc. Pop. 100,600

Nagina (na-gē'na), a town of Hindustan, in Bijnor district, Northwestern Provinces. Pop. 21,412.

Nagoya (nä-go'yä), a large city of Japan, island of Hondo, on the bay of Owari, 170 miles W. S. W. of Tokio. Has large manufactures. Pop. 447,881.

Nágpur (näg'pör), or NAGPORE, a town in India, capital of the Central Provinces, and of the division of Nagpur (area, 23,521 square miles; pop. 3,728,063), 440 miles E. N. E. of Bombay. It occupies a low, swampy flat, and is little better than a vast assemblage of huts straggling or huddled together in the most irregular manner. The municipal

area includes Sitabaldi Hill, where the British residency with a small cantonment is situated. There are other cantonments at Takli, 2 miles distant, and at Kampthi, the chief one, 9 miles distant. The manufactures include cotton and woolen cloths, and utensils of copper, brass, and other alloys. A bed of coal, estimated to contain 17,000,000 tons, at a depth of 200 feet, has been discovered at Nágpur. There is a trade in opium, hemp, and above all, in cotton, for which this is a great mart. Nágpur was formerly the seat of a line of rajahs, which became extinct in 1853, when their territory was annexed to the British dominions. Pop. (1911) 101,413.

Nagy (nåd'y'), a Hungarian word meaning 'great,' occurring in a number of place-names. The chief are: (1) NAGY-KAROLYI, a town in the northeast of Hungary, with manufactures of woolens, linens, etc. The castle of Count NAGY-KAROLYI, a town in the northeast of Hungary, with manufactures of woolens, linens, etc. The castle of Count Károlyi is here. Pop. 15,382.—(2) NAGY-KIKINDA, 35 miles southwest of Szegedin. Pop. 24,843.—(3) NAGY-LAK, in the Maros. Pop. 13,631.—(4) NAGY-SZALONTA (sà-lon'tà), about 20 miles southwest of Gross-Wardein. Pop. 14,-107. See also *Körös*.

Nahum (nā'hum), one of the twelve minor prophets, the author of a book of prophecies included in the Old Testament. His prophecies relate to the destruction of Nineveh, which he describes in vivid colors. The period in which he lived is, however, uncertain, probably 700-600 B.C.

Naia. See *Naja*.

Naiadæ (nī'a-dē), a nat. order of endogens, consisting of plants living in fresh or salt water in most parts of the world, having cellular leaves with parallel veins and inconspicuous hermaphrodite or unisexual flowers. *Zostera marina* (the grass-wrack) is the most familiar example.

Naiads (nī'adz), in the Greek mythology, nymphs of fountains and brooks, of similar character to the dryads, oreads, etc., analogous to the nixies of the northern mythology.

Naïdidæ (na-id'i-dē), a family or group of water worms, some of them of common occurrence in the mud of ponds and streams.

Nails (nālz), small pointed pieces of metal, generally with round or flattened heads, used for driving into timber or other material for the purpose of holding separate pieces together. They are of many different lengths and shapes. *Brads* used for nailing floors and ceilings have the head only on one side; the small sharp nails with round flat heads, used by saddlers and upholsterers, are called *tacks;* the small sharp taper nails without heads, used by shoemakers, are called *sprigs;* a variety in which the head is large and the spike small are called *hob-nails;* very large nails are called *spikes*. Until a comparatively recent period almost every kind of nail was produced by hand labor alone, each nail being separately forged from a thin rod of iron. These *wrought* nails are preferable, for many kinds of carpenter work, to those made by machinery. Making of wrought nails retains, in many places, the character of a domestic manufacture, the workman being often assisted by the female members of his family. In 1810 a machine was contrived by which nails could be cut from an iron sheet, and headed at one operation, at the rate of 100 per minute. This method was improved until some mills could turn out nails at the rate of 10 million an hour. More recently a method of making nails out of wire has been adopted and the old style cut nails have gone out of use.

Nails, OF ANIMALS, like hairs, are appendages which belong to the category of the exoskeletal elements of the animal frame, or as parts of the skin, of the outer layer of which they are modified appendages. A nail, in fact, is a specialized arrangement of the cells of the epidermis. In man the nails do not inclose the ends of the digits; but in the horse, and 'hoofed' or ungulate quadrupeds generally, the nails assume the form of protective coverings to the digits, and are then known as 'hoofs.' Nails may be produced to form 'claws,' as in birds and carnivorous mammals, while in the sloths they assume a large relative size, and are used as a means in arboreal progression. In the Amphibia—as in some toads, efts, etc.—the nails appear as mere thickenings of the skin at the extremities of the digits. The nails appear about the fifth month of fœtal or embryonic life.

Nain (nān), a town 8 miles from Nazareth, 42 from Jerusalem, at the foot of Mount Hermon, celebrated as the place where Christ restored a dead man to life. The town has now dwindled into a small hamlet named Nein.

Nairn (nārn), a small county in the northeast of Scotland, on the Moray Firth, with an area of 195 sq. miles. The south part of the county is hilly, and composed of gneiss and granite rocks; the lower valleys are occupied by

the Old Red Sandstone, and are of a more fertile nature. The principal rivers are the Findhorn and the Nairn, both having their sources in the county of Inverness, and flowing in nearly parallel courses, S. S. W. to N. N. E. Pop. 9155.—NAIRN, the county town, is the royal burgh and seaport near the mouth of the river of the same name. Its harbor is accessible only to small vessels. Fishing is carried on to a considerable extent, and Nairn is rising into repute as a watering-place. Pop. 5089.

Nairne (nārn), CAROLINE OLIPHANT, BARONESS, a Scottish poetess, belonging to the Oliphants of Gask, born 1766; married to William Murray Nairne, who in 1824 became Baron Nairne; died in 1845. She was the authoress of some exceedingly popular songs, including *The Laird o' Cockpen*, *The Land o' the Leal*, *The Auld House*, etc.

Naja (nä'jä), a genus of serpents, including several that are among the most dangerous of all the venomous snakes. The best known examples of the genus are *N. tripudians*, the cobra de capello of India, and the *N. haje* of Egypt, which is tamed by native jugglers, and is identified by many writers with the asp employed by Cleopatra to bring about her death. See *Cobra*, *Asp*.

Nakhichevan (nȧ-*hich*'e-vȧn) is the name of two towns in Russia. The first is situate on the right bank of the Don, in the government of Ekaterinoslav, 7 miles east of Rostoff. It is well and regularly built, chiefly in the oriental style. Pop. 30,883.—2. A town in the government of Erivan, near the left bank of the Aras, 175 miles south of Tiflis, regularly and substantially built. An Armenian tradition says Noah was its founder, and a mound of earth is still pointed out as his grave. Pop. 8845.

Namaqualand (nȧ-mä'qwä-land), GREAT, an extensive region in South Africa, extending along the west coast from the Orange River to Walfish Bay, and inland from the west coast to the Kalahari Desert; estimated area, 100,000 square miles. The greater part of this region is bare and barren, but in part it is favorable for the rearing of cattle. Copper ore appears to be in abundance in several localities. The lion, giraffe, rhinoceros, and hippopotamus, the gemsbok, eland, and other large antelopes are still found here. Germany took possession of Great Namaqualand in 1884. See *Namaquas*.

Namaqualand, LITTLE, an electoral division of Cape Colony south of the Orange River. It is a dry and barren region, but derives some importance from its copper mines. The chief mining station is Ookiep, 90 miles from Port Nolluth, with which it is connected by rail. Pop. about 17,000.

Namaquas (nȧ-mä'qwäs), the name given by Europeans to the Hottentot tribes inhabiting Great Namaqualand. They lead a half-pastoral, half-predatory life, yielding allegiance to a number of petty chiefs. Polygamy is universal among them. They are gradually disappearing before the Griquas and other mixed races. Missionaries have been laboring among them for some time.

Namaycush (nam'ȧ-cush), the great lake trout (*Salvelinus namaycush*), a favorite food fish of the Great Lakes and other northern United States lakes. It grows to 3 feet in length and weighs from 20 to 40 pounds, and is a gamey fish and excellent eating. Also known as Mackinaw trout, bear trout, and other local names.

Names (nāmz), PERSONAL. It is probable that at first all names were significant. Old Testament names are almost all original, that is, given in the first instance to the individual bearing them, and either originated in some circumstance of birth or expressed some religious sentiment, thus—Jacob (supplanter), Isaiah (salvation of Jehovah), Hannah (favor), Deborah (bee), etc. Neither the Hebrews, Egyptians, Assyrians, Babylonians, Persians, nor Greeks had surnames; and in the earliest period of their history the same may be said of the Romans. In course of time, however, every Roman citizen had three, the *prænomen* or personal name, the *nomen* or name of the gens or clan, lastly, the *cognomen* or family name, as Publius Cornelius Scipio. Conquerors were occasionally complimented by the addition of a fourth name or *agnomen*, commemorative of their conquests, as Publius Cornelius Scipio *Africanus*. Greek names refer to the personal appearance or character; and were often supplemented by the occupation, place of birth, or a nickname. Times of great public excitement have had a very considerable influence in modifying the fashion in names. It is impossible to state with any degree of certainty when the modern system of personal nomenclature became general. Surnames were introduced by the Norman adventurers, but were for centuries confined to the upper classes. They became general in Scotland about the twelfth century. In some of the wilder districts of Wales they can hardly be said to have been adopted even yet. The principal sources from

which surnames are derived are personal characteristics (Black, Long, Short), rank, profession, or occupation (Bishop, Knight, Miller), localities, or natural objects (Hill, Dale, Stone), and patronymics (Johnson, Wilson, Andrews). The Hebrews had no surnames proper, but to distinguish two men of the same name they used such forms as Solomon ben David ('Solomon son of David'). The Welsh use the word ap in the same way; Evan ap Richard ('John son of Richard' = Prichard). The Scotch use Mac for the same purpose. In Irish O' signifies grandson or descendant. The same method prevailed in some European nations, as Fitz, in old Norman, signifying son. The addition of the word son at the end of a family name has left its mark in many modern names. No process of law is necessary to effect a change of personal name; but it is customary, as a matter of record and as a future means of identification, for a person desiring to change his name to make application before a judge.

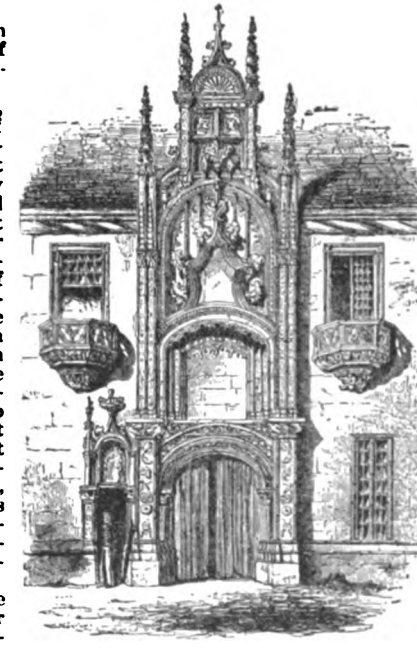
Nampa (nam'pa), a city of Canyon Co., Idaho, 22 miles w. of Boise, with livestock and general farming interests. Pop. 7621.

Namur (nȧ-mür); Flemish, *Namen*), a town of Belgium, capital of province of same name, situate at the confluence of the Meuse and Sambre, and at the foot of a bold promontory, strongly fortified. Sieges and bombardments had robbed the town of most of its ancient buildings, even before the European war (*q. v.*). The strategical position of Namur is highly important, and a series of nine detached forts replaced the old castles of its dukes. With the aid of these forts the Belgians maintained a stubborn resistance to the German armies which invaded the country in August, 1914. The German attack on Namur began on August 21, but it took three crucial days to reduce five of the nine forts and permit advance—three of the most important days of the war. The town had a population in 1910 of 31,940. The province, which has an area of 1413 square miles, is well watered by the Meuse, with its affluents, the Lesse and the Sambre. Agriculture and coal mining are the principal industries. Pop. 362,846.

Nanaimo (na-nȧ'mō), a port on the east side of Vancouver Island, where there are important coalmines. Pop. (1911) 8306.

Nana Sahib, the murderous leader of the Sepoys in the Indian mutiny. He was born in 1825, and adopted by the ruler of the Mahratta, state of Bithoor. On the death of the latter the British government refused to recognize Nana's claim to the succession. In May, 1857, there was a mutiny of the Sepoys in Cawnpore, and Nana placed himself at the head of the mutineers. The Europeans in Cawnpore capitulated on a promise that they should be sent down the Ganges in safety. But the men were all shot down and the women and children massacred. (See *Cawnpore.*) Nana was defeated by Sir H. Havelock, and was driven across the frontier into Nepaul. But there all knowledge of him ceases. The general opinion is that he escaped into Central Asia.

Nancy (năn-sē), a town of France, capital of the dep. Meurthe-et-Moselle, situated in a fertile plain, near the left bank of the Meurthe. It is divided into the old and the new town and several suburbs, and has wide and straight streets, handsome squares, and fine promenades, a triumphal arch, numerous statues, the palace (partly old)



Doorway of Ducal Palace, Nancy.

of the former dukes of Lorraine, an elegant specimen of Flamboyant Gothic, cathedral, several interesting churches, etc. The Church of St. Epure, recently com-

pleted, is very large, and is accounted one of the finest specimens of modern Gothic in France. Nancy is the see of a bishop, and has a university (with four faculties), a public library, a museum of paintings, botanical gardens, etc. The manufactures consist of broadcloth and other woolen stuffs: cotton spinning and weaving; hosiery, lace, all kinds of embroidery, stained paper, etc. The trade is extensive. At Nancy, in 1477, was fought the great battle between René, duke of Lorraine, and Charles the Bold of Burgundy, who was defeated and slain. From 1870 to 1873 Nancy was occupied by Germans. Pop. (1911) 119,949.

Nandu (nan'dö), the South American ostrich, a bird of the genus *Rhea*. See *Rhea*.

Nangasaki. See *Nagasaki*.

Nankeen (nan-kēn'), or NANKIN', a sort of cotton cloth, usually of a yellow color, originally manufactured and imported from Nanking in China. The peculiar color of these cloths is natural to the cotton (*Gossypium religiosum*) of which they are made. Nankeen is now imitated in most other countries where cotton goods are woven.

Nanking (nän-king'; that is, 'Southern Capital,' as opposed to Peking, 'Northern Capital'), a city of China, capital of the province of Kiangsu, near the right bank of the Yangtse-Kiang, 130 miles from its mouth and 560 miles south by east of Peking, with which it communicates by the Imperial Canal. It is 18 miles in circumference, and is surrounded by a wall generally above 40 feet high. It was at one time the capital of the Chinese Empire; but when the seat of government was transferred to Peking, about the end of the fourteenth century, it lost its importance and a great part of its population. Although an open river port few foreigners are resident. It was at Nanking that the British compelled the Chinese to submit to their terms of peace in 1842. Pop. estimated at 267,000.

Nanosaurus (nan-o-są'rus), NANOSAUR, a fossil lizard-like animal belonging to the group Deinosauria, discovered in North America, and about the size of a cat.

Nansen (nan'sen), FRIDTJOF, an Arctic explorer, was born in Norway in 1861. In 1888-89 he crossed Greenland in its lower section; on his return he published a number of scientific works. Under the auspices of the Norwegian government he sailed in 1893 from Christiana in the *Fram* (a specially built vessel) to attempt the discovery of the North Pole by allowing his vessel to freeze in the ice and drift northward. On March 14, 1895, in lat. 83° 59', he and Lieut. Johansen proceeded north on sledges, and on April 8th reached 86° 14' N. and long. 95° E. being 2° 50' nearer the pole than any previous explorer. On his return he delivered lectures in the United States and Great Britain, which were received with enthusiasm.

Nantes (nants; Fr. *nänt*), a town of France, on the Loire. The place is noted for the beauty of its streets and public buildings, and its quays line the banks of the rivers for nearly 2 miles. The public edifices most deserving of notice are the cathedral, in the Flamboyant style, dating from the fifteenth century, and containing many fine monuments; the castle, an edifice of the fourteenth century partly modernized in the sixteenth, with massive round towers; the Hôtel de Ville, the exchange, the theater, museum of natural history, picture gallery, the courts of justice and the Hôtel Dieu or infirmary. The chief industries are shipbuilding, and the manufacture of ships' boilers and machinery, linens, cottons, sail-cloth, flannel, chemicals, leather, ropes, soap, etc. Nantes is a flourishing seaport; but part of the foreign trade centers in St. Nazaire, at the mouth of the Loire. Before the conquest of Gaul by the Romans Nantes was a place of some note. For a long time it formed one of the most valuable possessions of the dukes of Brittany; but in 1499 the heiress of the dukedom, Anne of Brittany, having here married Louis XII, it passed with the rest of her possessions to the crown of France. In 1793 it was the scene of some of the most atrocious massacres of the French revolution, the *Noyades* or drownings of the monster Carrier being perpetrated here. Men, women and children were destroyed also by shooting. As many as 600 persons are known to have perished in one day, and it is estimated that in the town and surrounding country 30,000 people were destroyed. Pop. (1911) 170,535.

Nantes, EDICT OF, was signed by Henry IV in that city, April 30, 1598. It allowed the Protestants the free exercise of their religion, and threw open to them all offices of state. This edict was formally revoked by Louis XIV, on October 20, 1685. As a consequence of this fatal act for France about 400,000 Protestants emigrated to Britain, Holland and other Protestant countries.

Nanticoke (nan'ti-kōk), a town of Luzerne county, Pennsylvania, 8 miles W. S. W. of Wilkes-Barre. Mining anthracite coal is its chief busi-

ness. It has silk and hosiery mills, etc. Pop. (1910) 18,877; (1920) 22,614.

Nantucket (nan-tuk'et), an island of Massachusetts, 18 miles south of Cape Cod, 15 miles long and from 3 to 4 miles wide. The town of Nantucket is situated on the north side of the island, and has a deep and secure harbor. The climate is mild in winter and cool in summer, and the island has of late become a favorite summer resort. Pop. (1920) 2797.

Nantwich (nant'wich), a town of Cheshire, England, on the Weaver, 19 miles S. E. of Chester. It has a fine cruciform church. Shoes, cotton goods, etc., are made. Pop. 7815.

Nanty Glo (nan'ti-glō), a borough of Cambria Co., Pa., 12 miles N. of Johnstown, in a coal-mining district. Pop. (1920) 5028.

Nanuk (nan'uk), the founder of the Sikh religion, born near Lahore in 1469. He taught men to worship the One Almightly Invisible God, to live virtuously, and to be tolerant of the failings of others. He died in 1539.

Napa (nă'pa), a city, county seat of Napa Co., California, on navigable Napa River, 39 miles N. by E. of San Francisco, in a fruit district noted for its prunes, pears, cherries and early apples. It has tanneries, fruit-packing plants, and shoe, glove and shirt factories. Pop. (1920) 6757.

Naphtali (naf'tà-lī; Hebrew, 'my wrestling'), the sixth son of Jacob, and the head of one of the twelve tribes. The tribe had its full share in repelling the incursions of the Canaanites during the first centuries of the conquest, but disappears from history when Tiglath-pileser overran the north of Israel and bore away the whole of the population to Assyria. Under the title of Galilee the district occupied by the tribe became in New Testament times more famous than it had ever been before.

Naphtha (nap'tha, naf'tha), a term which includes most of the inflammable liquids produced by the dry distillation of organic substances. *Mineral or native naphtha*, or *petroleum*, is an inflammable liquid which is found in very many countries, but especially in California, and other American States and at Baku on the Caspian Sea. It consists of a mixture of hydrocarbons chiefly belonging to the paraffin series, but it also contains members of the olefine and of the benzine series. *Boghead naphtha*, which is also known as *photogen* and *paraffin oil*, is obtained by distilling certain minerals allied to coal, such as the Torbane Hill mineral or Boghead coal, found at Bathgate in Scotland. *Coal naphtha* is obtained by the distillation of coal-tar. After the *light oil* has been separated it is shaken with caustic soda and afterwards with sulphuric acid. The liquid portion is then run off and rectified. *Shale naphtha* is a mixture of paraffins obtained by distilling bituminous shales. When petroleum is distilled, that portion which distills below 76° C. is sold as *petroleum spirit* or *petroleum ether*, and is used for dissolving India-rubber and making varnishes. The next fraction of the distillate is sold under the names benzoline, paraffin oil, or mineral sperm oil. Benzine occurs in petroleum, but is more abundant in the light oil obtained in distillation of coal-tar. Nitro-benzine is largely employed in the preparation of aniline.

Naphthalene (nap'tha-lēn), a crystalline hydrocarbon with an odor of coal-gas, occasionally deposited in gas-pipes in cold weather. It is a very common product of the action of a high temperature upon substances rich in carbon; coal and wood yield it on distillation; marsh-gas, alcohol vapor, and ether vapor deposit crystals of naphthalene when passed through a red-hot tube. When coal-tar is distilled and the temperature has risen to about 200° C., the distilled liquid partly solidifies on cooling from the crystallization of naphthalene. This portion is pressed to expel the liquid part and boiled with alcohol, which deposits the naphthalene as it cools. Naphthalene red was discovered in 1887; it comes into commerce under the name of *magdala* red, in the form of a black-brown crystalline powder.

Naphthyl (naf'thil), a hydrocarbon obtained, together with other products, by heating naphthalene with a mixture of manganese dioxide and sulphuric acid diluted with twice its weight of water. *Naphthol*, or *naphthyl alcohol*, is a derivative of naphthyl. Dinitronaphthol is produced from *naphthol*, and is one of the most beautiful and permanent of yellow dyes, coloring silk and wool in all shades from light lemon to deep gold-yellow.

Napier (nā'pi-ẽr), a town of New Zealand, situated on Hawke's Bay, in North Island. The district is principally a grazing one, large quantities of wool being grown. Tinned and frozen meat are also exported. Pop. 9454.

Napier (nā'pi-ẽr), SIR CHARLES JAMES, a British general and administrator, born in 1782. He entered the army in 1794, and served in Ireland and Portugal, being present at Corufia, where he was wounded and taken prisoner

in 1809. In 1811, when again at liberty, he returned to the Peninsula, and served through the war, being severely wounded in several battles. In 1812 he was made lieutenant-colonel, and in the following year served in the expedition to the Chesapeake. He missed the battle of Waterloo, which took place three days before he reached the scene of action. On the peace a period of inactivity ensued, varied only by his appointment as governor of the island of Cephalonia, and by a short command of the military district of the north of England. In 1837 he was made major-general; in 1838 K.C.B. In 1841 he was appointed to the chief command in

General Sir Charles Napier.

the Presidency of Bombay, with the rank of major-general, and was shortly afterwards called to Scinde. Here he gained the victories of Meanee and Hyderabad, and was afterwards made governor of Scinde, which he administered till 1847. He had quarreled with the directors of the East India Company, but during a panic caused by the want of anticipated success in the war with the Sikhs in 1849 his services were again required, and he sailed once more for the East, as commander-in-chief of all the forces in India. Before he arrived Lord Gough had brought the Sikh war to a triumphant termination, and no special work remained for Sir Charles Napier to perform. Having returned to England he died in 1853.

Napier, ADMIRAL SIR CHARLES, a British naval commander, cousin of Sir Charles James and Sir William Francis Napier, was born in 1786; died in 1860. He entered the navy as midshipman in 1799, was promoted lieutenant in 1805, and sent to the West Indies, where he served in the operations against the French. He was promoted commander by Admiral Cochrane in August, 1809, and in 1811 was employed in Portugal and along the coast of Southern Italy. In 1813 he was attached to the North American squadron, and in August of the following year he led the expedition up the Potomac River. At the conclusion of the war he was made a C.B. In 1833 he accepted the command of the Portuguese Constitutional fleet, and effected the establishment of Donna Maria on the throne. Returning to England, he was appointed in 1839 to the command of the *Powerful*, and orde ed to the Mediterranean, where, on the outbreak of the war between Mehemet Ali and the Porte, and the coöperation of Britain with Russia and Austria on behalf of the latter power, Sir Charles Napier performed some of his most gallant exploits, including the storming of Sidon and the capture of Acre. Having blockaded Alexandria, he concluded on his own responsibility a convention with Mehemet Ali, by which the latter and his family were guaranteed in the hereditary sovereignty of Egypt on resigning all claim to Syria. On his return to England he was created K.C.B. In 1841 he was elected member for Marylebone. In 1847 he received the command of the Channel Fleet as rear-admiral; and in 1854, on the commencement of the Russian war, he was nominated to the command of the Baltic fleet, being now a rear-admiral. In this capacity he accomplished little beyond the capture of Bomarsund. He sat in parliament as member for Southwark from 1855 till his death. He published a series of *Letters to Lord Melville on the State of the Navy;* an account of the *War in Portugal* and of the *War in Syria;* and numerous contributions to the *United Service Magazine.*

Napier, JOHN, Laird of Merchiston, near Edinburgh, the inventor of logarithms, was born in 1550; died in 1617. He was educated at St. Andrew's, traveled on the Continent, and ultimately settled down at the family seats of Merchiston, near Edinburgh, and Gartness, in Stirlingshire, as a recluse student. In 1614 he published his book of logarithms (*Logarithmorum Canonis Descripto;* Edinburgh, 4to). The invention was very soon known over all Europe, and was everywhere hailed with admiration by men of science. Napier followed it up, in 1617, by publishing a small treatise, giving an account of a method of performing the operations of multiplication and division by means of a number of small rods. These materials for calculation maintained for many years a place in

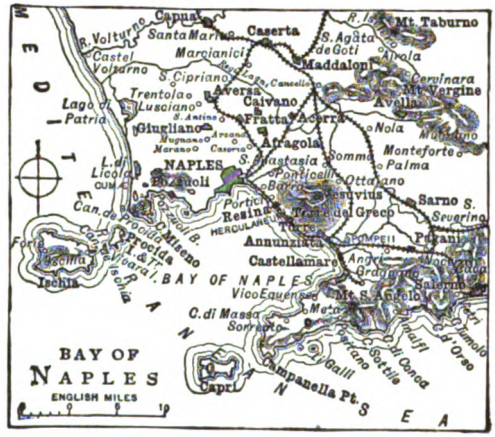
science, and are known by the appellation of Napier's Bones. His eldest son, ARCHIBALD, who succeeded him, was raised to the rank of a baron by Charles I in 1627, under the title of Lord Napier, which is still borne by his descendants.

Napier, ROBERT CORNELIUS, Baron Napier of Magdala, born in Ceylon December 6, 1810, son of Major C. F. Napier. He entered the Royal Engineers in 1826, and served in the Sutlej campaign in 1845-46, where he was severely wounded. In 1848-49 he served in the Punjab, and was chief engineer at the siege of Mooltan. He was chief of staff to Sir J. Outram in 1857, and was prominent in the relief of Lucknow at the beginning of the Indian mutiny. In the Chinese war of 1860 he commanded a division with the local rank of major-general. In October, 1867, he was intrusted with the command of the Abyssinian expedition, and captured Magdala, April 13, 1868. He was then made Baron Magdala and G. C. B. In 1870 he was made commander-in-chief in India, with the rank of general, became governor of Gibraltar in 1876, was made field-marshal in 1883, and Constable of the Tower in 1887. He died in 1890.

Napier, SIR WILLIAM FRANCIS PATRICK, a British officer, brother of Sir Charles James Napier, the conqueror of Scinde, was born in 1785; died in 1860. At the age of fourteen he entered the army, served at the siege of Copenhagen, and with his brothers Charles and George took a distinguished part in the Peninsular campaigns, became lieutenant-colonel in 1813, and colonel in 1830. Some years after the conclusion of peace he commenced his celebrated *History of the Peninsular War*, the publication of which began in 1828, and extended over the intermediate period till 1840. In 1841 Colonel Napier was advanced to the rank of major-general; he was appointed lieutenant-governor of Guernsey the following year, and in 1848 created a K.C. B. He also wrote *History of the Conquest of Scinde*, *History of the Administration of Scinde*, *Life of Sir Charles James Napier*, etc.

Naples (nā'plz; Italian, *Nap'oli*), a city in Southern Italy, the largest in the kingdom, situated on the northern shore of the beautiful Bay of Naples, about 160 miles from Rome. Its site is magnificent, being on the side of a nearly semicircular bay, partly along the shore, and partly climbing the adjacent slopes, bounded on the one side by the picturesque heights of Posilipo, and on the other by the lofty mass of Vesuvius, while the background is rich in natural beauty. The environs are densely peopled, towns and villages being numerous around the bay as well as inland. The city is divided into two unequal parts by a steep ridge proceeding from the height on which stands the castle of St. Elmo, and terminated by a rocky islet surmounted by the Castello dell' Ovo. The largest and most ancient part of Naples lies to the S. E. of these heights. This now forms the business quarter, and is intersected from N. to S. by the main street, the Toledo, now Via di Roma. The western and more modern part of the city is the fashionable quarter, has a superior situation, and commands magnificent views. The chief street in this quarter is the Corso Vittorio Emanuele, 2½ miles in length. The city measures about 3 miles in length by 2 in breadth; the streets are mostly well-paved with lava or volcanic basalt, and the houses are large, lofty, and solidly built, and have flat roofs. There are few remains of ancient times, but there are five castles, S. dell' Ovo, Nuovo, dell Carmine, Capuano, Elmo, and the gates Porta del Carmine and Capuano, all of mediæval construction. Among the more remarkable public edifices is the cathedral, dating from 1272, a large Gothic building erected on the site of two temples dedicated to Neptune and Apollo. It is held in high veneration in consequence of possessing the relics of St. Januarius or Gennaro. Other edifices are the church De' Santi Apostoli, said to have been originally founded by Constantine the Great on the site of a temple of Mercury, and, though subsequently rebuilt, still very ancient; the church of St. Paul, built in 1817-31 in imitation of the Pantheon at Rome; the Palazzo Reale (Royal Palace, a building of great size in the lower part of the town); the palace of Capo di Monte, situated on a height in the outskirts; the old palace, where the courts of justice now hold their sittings; the Palazzo dei Publici Studj, formerly occupied by the university, but now converted into the Museo Nazionale, a museum containing not only a valuable library of 275,000 volumes and many rare MSS., but also the older and more recent collections belonging to the crown, the Farnese collection of paintings and sculpture from Rome and Parma, and an unequaled collection of gems, bronzes, vases, etc., chiefly obtained from the excavations of Pompeii and Herculaneum; numerous theaters, of which that of San Carlo is remarkable for its magnificence, and is one of the largest in existence. Naples has a university, dating from 1224, and attended by over 3000 students; many other educational institutions, and numer-

ous foundations. The manufactures, which are numerous but individually unimportant, include macaroni, woolens and cottons, silks known as *gros de Naples*, glass, china, musical instruments, flowers and ornaments, perfumery, soap, chemicals, machinery, etc. The harbor accommodation has recently been extended, and the trade is important. The exports consist chiefly of bones, cream of tartar, hoops, linseed, hemp, wheat, figs, gloves, liquorice, madder, coral, macaroni, oil, wine, wool, tallow, rags and silk, raw, dyed and manufactured. Naples is one of the most densely populated cities of Europe, and one of the most peculiar features of the city is its unique population and the universal publicity in which life is passed. In the environs are situated the tomb of Virgil, the ancient ruined cities of Herculaneum and Pompeii, the remains of Roman temples, villas, palaces and tombs, together with the physical phenomena of Vesuvius. Pop. (1911) 723,000.



History.—Naples was founded by a Greek colony from the town of Cumæ many centuries before Christ. It took the name of Neapolis ('New City') to distinguish it from a still older Greek city adjoining called *Parthenŏpē*. It passed to the Romans in 290 B.C. In 536 A.D. it was taken by Belisarius, and was pillaged by Totila in 542. In 1130 the Norman Robert Guiscard united the south of Italy and the adjacent island of Sicily into one political unity and from that period the history of Naples ceases to be the history of a city, but becomes the history of a kingdom forming part of the Kingdom of the Two Sicilies, Naples being recognized as the metropolis. In the year 1189 the kingdom passed from the Norman to the Suabian race. In 1266 Charles of Anjou defeated the Suabians, and was crowned king of the Two Sicilies. The kingdom was ruled by this dynasty until 1441, when it came under the dominion of the princes of Aragon. In the early part of the sixteenth century it came into the possession of Spain, which governed it by viceroys until 1707. Under the rule of the Spanish viceroys broke out the famous insurrection under Masaniello in 1647. It was similarly governed by Austria until 1735, when it was erected into an independent monarchy in favor of Don Carlos, or Charles of Bourbon. On the latter's accession to the throne of Spain, in 1759, he was succeeded by his son Ferdinand IV. In 1798 the French republicans entered Naples, which became a republic; but a loyalist rising led to the return of the king. His reign was again interrupted in 1806, when Napoleon succeeded in placing first his brother Joseph, and on Joseph's removal to Spain, his brother-in-law Murat, on the throne of Naples. In 1815 Ferdinand regained his throne, and changed his title to Ferdinand I. Upon his death, in 1825, he was succeeded by Francis I, who died in 1830. This prince was followed by his son Ferdinand II, notorious under the nickname of *Bomba*. (See *Ferdinand I* and *II.*) He died in 1859, and his son, Francis II, was his successor. The latter continued the abuses of the old régime, and in the revolution that broke out in 1860 under the guidance of Garibaldi he was deposed, and Naples and Sicily were added to the Kingdom of Italy.

Naples, BAY OF (anciently, *Crater Sinus*), on the west coast of Italy, in the Mediterranean, extending for about 35 miles from the Capo di Miseno, its N. W. boundary, to the Punta della Campanella, its S. E. limit. It is separated from the open sea by the islands of Procida, Ischia and Capri. Its shores have for ages been the scene of powerful volcanic agency, and the scenery has long been celebrated for its beauty and grandeur. Mount Vesuvius is the most striking and distinctive feature.

Naples-yellow, a pale golden-yellow pigment composed of the oxides of lead and antimony. It is employed not only in oil-painting, but also

for porcelain and enamel. Chromate of lead is sometimes used as a substitute for this color.

Napoleon I (na-pō'le-on), Emperor of the French, was born August 15, 1769, at Ajaccio, Corsica, and was the son of Charles Bonaparte, an advocate, and of Letizia Ramolino. (See *Bonaparte.*) In his tenth year he was sent to the military school of Brienne, and after a short time spent at that of Paris he received, in 1785, his commission as lieutenant of artillery. During the development of the revolution Napoleon took the popular side, but in a quiet and undemonstrative way. In 1792 he became captain of artillery, and in 1793 he was sent, with the commission of lieutenant-colonel of artillery, to assist in the reduction of Toulon, then in the hands of the British. The place was captured (December 19) entirely through his strategic genius; and, in the following February, he was made a brigadier-general of artillery. In 1795, when the mob of Paris rose against the Convention, Napoleon was made commander of the 5000 troops provided for its defense. He had only a night to make arrangements, but next morning he scattered the mob with grapeshot, disbanded the national guard, disarmed the populace, and ended the outbreak. On March 9, 1796, he married Josephine Beauharnais, and soon after he had to depart to assume the command given him of the army of Italy against the forces of Austria and Sardinia. After a series of victories, culminating in that of Lodi (May 10), Naples, Modena and Parma hastened to conclude a peace, the pope was compelled to sign an armistice, and the whole of Northern Italy was in the hands of the French. Army after army sent by Austria was defeated (at Roveredo, Bassano, Arcole, Rivoli, etc.); Napoleon carried the war into the enemy's country; and by the Peace of Campo Formio, which followed (October 17, 1797), Austria ceded the Netherlands and Lombardy, and received the province of Venetia. The pope had previously been forced to cede part of his dominions.

In December, 1797, Napoleon returned to Paris. About this time the Directory determined to invade Egypt, as a preliminary step to the conquest of British India. Napoleon was put in command of the expedition, and on July 1, 1798, he landed at Alexandria. This city fell on the 4th of July, and Cairo was taken on the 24th, after the sanguinary battle of the Pyramids. On August 4th, Nelson annihilated the French fleet in the Bay of Aboukir. All means of return to Europe for the French were thus cut off; but Napoleon having suppressed with rigor a riot at Cairo, advanced to attack the Turkish forces assembling in Syria. He took El Arish and Gaza, and stormed Jaffa. But after sixty days' siege he was compelled to abandon the attempt to capture Acre, which was defended by a Turkish garrison under Djezzar Pasha, assisted by Sir Sydney Smith and a small body of English sailors and marines. He reëntered Cairo on June 14, 1799, and on the 25th of July attacked and almost annihilated a Turkish force which had landed at Aboukir. On the 22d of August he abandoned the command of the army to Kléber, and embarking in a frigate, landed at Fréjus, France, October 9, having eluded the English cruisers. He hastened to Paris, secured the cooperation of Moreau and the other generals then in the capital, and abolished the Directory on the 18th and 19th Brumaire (November 9-10). A new constitution was then drawn up chiefly by the Abbé Siéyès, under which Napoleon was made first consul, with Cambacérès and Lebrun as second and third consuls. From this time he was virtually ruler of France.

Napoleon's government was marked by sagacity, activity and vigor in the administration of civil affairs, and so far was highly beneficial to France. But war was his element, and in 1800 he resolved to strike a blow at Austria. Having executed a daring march into Italy across the Great St. Bernard, he defeated the Austrians at Marengo, and after the decisive battle of Hohenlinden, Austria obtained peace by the Treaty of Lunéville, 1801. Treaties were subsequently concluded with Spain, Naples, the pope, Bavaria, Portugal, Russia, Turkey, and, finally, on March 27, 1802, the treaty known as that of Amiens was signed by Britain. In 1802 Napoleon was proclaimed by a decree of the senate consul for life, and in 1804 he had himself crowned as emperor, upwards of 3,000,000 votes of the people being given in favor of this measure. To this period belongs the famous body of laws known as the *Code Napoléon.* See *Code.*

In 1803 war had again broken out with Britain, and Napoleon collected an army and flotilla with the purpose of invading England. In 1805 Britain, Russia, Austria and Sweden united against Napoleon, who at once gave up his purpose of invasion, marched across Bavaria at the head of 180,000 men, and compelled the Austrian General Mack to capitulate at Ulm with 23,000 men (October 20), the day before Nelson's great victory at Trafalgar. On November 13 he entered

Vienna, and on December 2, having crossed the Danube, he completely routed the allied Russian and Austrian armies at Austerlitz. The Austrian emperor instantly sued for peace, giving up to France all his Italian and Adriatic territories. In February, 1806, a French army occupied the continental part of the Neapolitan states, of which Joseph Bonaparte was declared king on the deposition of their former sovereign. Another brother of the emperor, Louis, was made King of Holland. Various districts in Germany and Italy were erected by the conqueror into dukedoms and bestowed upon his most successful generals. This brought him into collision with Prussia, and war was declared on October 8. On the 14th Napoleon defeated the enemy at Jena, while his general, Davoust, on the same day gained the victory of Auerstädt. On the 25th Napoleon entered Berlin and issued the celebrated Berlin Decrees, directed against British commerce. He then marched northwards against the Russians, who were advancing to assist the Prussians. At Pultusk (December 28) and at Eylau (February 8, 1807) he met with severe checks; but on June 14 was fought the battle of Friedland, which was so disastrous to the Russian armies that Alexander was compelled to sue for an armistice. On July 7 the Peace of Tilsit was concluded, by which the King of Prussia received back half of his dominions, and Russia undertook to close her ports against British vessels. The Duchy of Warsaw was erected into a kingdom and given to the King of Saxony; the Kingdom of Westphalia was formed and bestowed upon Jérôme, Napoleon's youngest brother; and Russia obtained a part of Prussian Poland, and by secret articles was allowed to take Finland from Sweden. As Portugal had refused to respect the Berlin Decrees, Napoleon sent Junot to occupy Lisbon (November 30, 1807). The administrative affairs of Spain having fallen into confusion, Napoleon sent an army under Murat into that kingdom, which took possession of the capital, and by the Treaty of Bayonne, Charles IV resigned the Spanish crown, which was given to Joseph Bonaparte, Murat receiving the vacant sovereignty of Naples. The great body of the Spanish people rose against this summary disposal of the national crown, and Britain aided them in their resistance. Thus was commenced the Peninsular war, which lasted seven years. A French squadron was captured by the British at Cadiz (June 14, 1808); General Dupont surrendered at Baylen with 18,000 men (July 22); Junot was defeated by Sir Arthur Wellesley (Wellington) at Vimeira (August 21). But Napoleon rushed to the scene of action in October at the head of 180,000 men and entered Madrid in spite of all resistance by the Spaniards on December 4. The British troops, now under Sir John Moore, were driven back upon Corunna, where they made a successful stand, but lost their general (January 16, 1809). In the meantime Austria again declared war and got together an army in splendid condition under the Archduke Charles. Napoleon hurried into Bavaria, encountered the archduke at Eckmühl (April 22), and completely defeated him; on May 13 he again entered Vienna. On May 21st and 22d he was himself defeated at Aspern and Esslingen; but on July 6 the Austrians were crushed at Wagram, which enabled Napoleon to dictate his own terms of peace; these were agreed to on October 14 at Schönbrunn. On his return to Paris, Napoleon had himself divorced from Josephine, for the reason that she had borne him no children, and on April 2, 1810, he was married to the Archduchess Maria Louisa of Austria. The fruit of this union was a son. (See next article.)

The years 1810 and 1811 were the period of Napoleon's greatest power. On the north he had annexed all the coast line as far as Hamburg, and on the south Rome and the southern Papal provinces. But now the tide began to turn. Russia showed a disinclination to carry out the continental blockade and give effect to the Berlin Decrees; so, in May, 1812, Napoleon declared war against that country, and soon invaded it with an army of about 500,000 men. The Russians retired step by step, wasting the country, carrying off all supplies, and avoiding as far as possible general engagements. The French pushed rapidly forward, defeated the Russians at Borodino and elsewhere, and entered Moscow only to find the city on fire. It was impossible to pursue the Russians farther, and after waiting for some time in Moscow in vain hope of a proposal of peace from the Russian emperor, nothing remained but retreat. The winter proved uncommonly severe, and swarms of mounted Cossacks incessantly harassed the French, now sadly demoralized by cold, famine, disease and fatigue. Of the invaders only about 25,000 succeeded in escaping from Russia. Napoleon immediately ordered a fresh conscription, but the spirit of Europe was now fairly roused. Another coalition, consisting of Prussia, Russia, Great Britain, Sweden and Spain, was formed,

which, early in 1813, sent its forces towards the Elbe. Napoleon had still an army of 350,000 in Germany. He defeated the allies at Lützen, at Bautzen, and at Dresden; but the last was a dearly-bought victory for the French, who were now so outnumbered that their chief was compelled to fall back on Leipzig. There he was hemmed in, and in the great 'Battle of Nations,' which was fought on the 16th, 18th and 19th of October, he was completely defeated. He succeeded in raising a new army, and from January to March, 1814, he confronted the combined hosts of the allies. But numbers were against him; and Wellington rapidly advanced upon Paris from the south. On March 30 the allies captured the fortifications of Paris, and on the 31st the Emperor Alexander and Wellington entered the city. On April 4 Napoleon abdicated at Fontainebleau. He was allowed the sovereignty of the island of Elba, with the title of emperor and a revenue of 6,000,000 francs, and Louis XVIII was restored. After a residence of ten months he made his escape from the island, and landed at Fréjus on March 1, 1815. Ney and a large part of the army joined him, and he made a triumphal march upon Paris; but it was mainly the army and the rabble that he now had on his side. The allied armies once more marched towards the French frontier, and Napoleon advanced into Belgium to meet them. On June 16 he defeated Blücher at Ligny, while Ney held the British in check at Quatre-Bras. Wellington fell back upon Waterloo, where he was attacked by Napoleon on the 18th, the result being the total defeat of the French. The allies marched without opposition upon Paris. Napoleon abdicated in favor of his son, and tried to escape from France, but failing, he surrendered to the captain of a British man-of-war. With the approval of the allies he was conveyed to the island of St. Helena, where he was confined for the rest of his life. He died in May, 1821, and was buried in the island, but in 1840 his remains were transferred to the Hôtel des Invalides at Paris.

Napoleon II, NAPOLEON FRANÇOIS JOSEPH CHARLES BONAPARTE, only son of the preceding, was born in Paris in 1811; died at Schönbrunn in 1832. In his cradle he was proclaimed King of Rome. On the first abdication of the emperor he accompanied his mother, Maria Louisa of Austria, to Vienna. His title there was Duke of Reichstadt. He never assumed the title of Napoleon II; but on the accession of his cousin Louis Napoleon in 1852, some title being necessary, the late emperor took that of Napoleon III, which being recognized by the governments of Europe, implied the recognition of the former title.

Napoleon III, CHARLES LOUIS NAPOLEON BONAPARTE, Emperor of the French, was born at Paris in 1808; died at Chislehurst, England, in 1873. He was the youngest son of Louis Bonaparte, brother of Napoleon I and King of Holland, and of Hortense de Beauharnais. His early life was spent chiefly in Switzerland and Germany. By the death of his cousin, the Duke of Reichstadt (Napoleon II, see above), he became the recognized head of the Bonaparte family, and from this time forward his whole life was devoted to the realization of a fixed idea that he was destined to occupy his uncle's imperial throne. In 1836 an attempt was made to secure the garrison of Strasburg, but the affair turned out a ludicrous failure. The prince was taken prisoner and conveyed to Paris, and the government of Louis Philippe shipped him off to the United States. The death of his mother brought him back to Europe, and for some years he was resident in England. In 1840 he made a foolish and theatrical descent on Boulogne; was captured, tried, and sentenced to perpetual confinement in the fortress of Ham. After remaining six years in prison he escaped and returned to England. On the outbreak of the revolution of 1848 he hastened to Paris, and securing a seat in the National Assembly he at once commenced his candidature for the presidency. On the day of the election, December 10th, it was found that out of 7,500,000 votes Louis Napoleon had obtained 5,434,226; Cavaignac, who followed second, had but 1,448,107. On the 20th the prince-president, as he was now called, took the oath of allegiance to the republic. He looked forward to a higher position still, however, and pressed for an increase of the civil list from 600,000 francs first to 3,000,000, then to 6,000,000, with his term of office extended to ten years, and a residence in the Tuileries. At last, on the evening of December 2, 1851, the president declared Paris in a state of siege, a decree was issued dissolving the assembly, 180 of the members were placed under arrest, and the people who exhibited any disposition to take their part were shot down in the streets by the soldiers. Another decree was published at the same time ordering the re-establishment of universal suffrage, and the election of a president for ten years. When the vote came to be taken, on the 20th and 21st of the same

month, it was discovered that 7,439,216 suffrages were in favor of his retaining office for ten years, with all the powers he demanded, while only 640,737 were against it. As soon as Louis Napoleon found himself firmly seated he began to prepare for the restoration of the empire. In January, 1852, the National Guard was revived, a new constitution adopted, and new orders of nobility issued; and at last, on December 1, 1852; Louis Napoleon Bonaparte was proclaimed emperor under the title of Napoleon III. On January 29, 1853, the new sovereign married Eugénie Marie de Montijo, countess de Teba; the result of this union being a son, Napoleon-Louis, born March 16, 1856. In March, 1854, Napoleon III, in conjunction with England, declared war in the interest of Turkey against Russia. (See *Crimean war.*) In April, 1859, hostile relations developed between Austria and Sardinia, and Napoleon took up arms in support of the Sardinian cause. The allies defeated the Austrians at Montebello, Magenta, Marignano and Solferino. By the terms of the Peace of Villafranca Austria ceded Lombardy to Italy, and the provinces of Savoy and Nice were given to France in recognition of her powerful assistance (March 10, 1860). In 1860 the emperor sent out an expedition to China to act in concert with the British; and in 1861 France, England and Spain agreed to despatch a joint expedition to Mexico for the purpose of exacting redress of injuries, but the English and Spaniards soon withdrew. The French continued the quarrel, and an imperial form of government was initiated, Maximilian, archduke of Austria, being placed at its head with the title of emperor. Napoleon, however, withdrew his army in 1867 in response to the stern demand of the United States, and the unfortunate Maximilian, left to himself, was captured and shot. On the conclusion of the Austro-Prussian war of 1866 Napoleon, jealous of the growing power of Prussia, demanded a reconstruction of the frontier, which was peremptorily refused. The ill feeling between the two nations was increased by various causes, and in 1870, on the Spanish crown being offered to Leopold of Hohenzollern, Napoleon demanded that the King of Prussia should compel that prince to refuse it. Notwithstanding the subsequent renunciation of the crown by Leopold war was declared by France (July 19, 1870). (See *Franco-German war.*) On July 28, Napoleon set out to take the chief command, but his forces were illy prepared and were everywhere defeated, with the result that, on September 2, the army with which he was present was compelled to surrender at Sedan. One of the immediate consequences of this disaster was a revolution in Paris. The empress and her son secretly quitted the French capital and repaired to England, where they took up their residence at Camden House, Chislehurst. Here they were rejoined by the emperor (who had been kept a prisoner of war for a short time) in March, 1871, and here he remained till his death. His only child, the prince imperial, who had joined the British army in South Africa as a volunteer, was killed by the Zulus, June 2, 1879.

Napoleon, or NAP, a game of cards, a modified form of six-handed euchre, in which the player who declares the highest number of tricks has the lead.

Napoléon-Vendee. See *Roche-sur-Yon.*

Napoli de Romania, or NAUPLIA (na'pli-a), a seaport town of Greece, 28 miles s. s. w. of Corinth. The Bay of Nauplia has excellent anchorage, and there is a good harbor. Pop. (commune) 13,000.

Naprapathy (na-prăp'pa-thi), a system of curing human ailments by locating and correcting diseased ligaments. The naprapath declares that the cause of all human ills is to be found in diseased ligaments. Every one of the spinal nerves must pass through ligamentous tissue as it leaves the spinal column. An irritation to the nerves by diseased connective tissue sets up symptoms or effects in organs supplied by these nerves. Instead of treating the effects or symptoms, the naprapath directs his diagnosis and treatment to the diseased ligament—the cause. Specially devised manipulations are employed in the treatment. The fundamental principles of naprapathy were enunciated by Dr. Oakley Smith of Chicago in 1905.

Napu (nä'pü), a very small, peculiarly elegant musk-deer (*Tragŭlus napu*) inhabiting Java and Sumatra.

Narbada. See *Nerbudda.*

Narbonne (när-bon; Latin, *Narbo Martius*), a town of Southern France, department of Aude, situated in a wine-growing plain, 5 miles from the Mediterranean. It has dark, winding streets, a fine church (the choir only completed), a Gothic structure founded in 1272; and a castellated town-hall, formerly an archbishop's palace. The manufactures are not important. The honey of Narbonne is celebrated. Narbonne was the first colony which the

Romans founded beyond the Alps. It became the capital of Gallia Narbonensis, but is very poor in Roman remains. Pop. (1911) 23,280.

Narcissus (när-sis'us), according to Greek mythology the son of the river-god Cephissus. The young Narcissus was of surpassing beauty, but excessively vain and inaccessible to the feeling of love. Echo pined away to a mere voice because her love for him found no return. Nemesis determined to punish him for his coldness of heart, and caused him to drink at a certain fountain, wherein he saw his own image, and was seized with a passion for himself of which he pined away. The gods transformed him into the flower which bears his name.

Narcissus, an extensive genus of bulbous plants, mostly natives of Europe, nat. order Amaryllidaceæ. The species are numerous, and from their hardiness, delicate shape, gay yellow or white flowers, and smell, have long been favorite objects of cultivation, especially the daffodil (*N. Pseudonarcissus*), the jonquil (*N. Jonquilla*), polyanthus narcissus (*N. Tazetta*), and white narcissus (*N. poeticus*). Some of the more hardy species grow wild in our woods and under our hedges.

Narcotic (när-kot'ik), derived from a Greek term signifying numbness or torpor, is the name given to a large class of substances which, in small doses, diminish the action of the nerves. Most narcotics are stimulating when given in moderate doses; in larger doses they produce sleep; and in poisonous doses they bring on stupor, coma, convulsions, and even death. Opium, hemlock, henbane, belladonna, aconite, camphor, digitalis, tobacco, alcohol, leopard's-bane, and a variety of other substances, are narcotics.

Narcotine (när'kō-tin), an alkaloid contained in opium to the amount of 6 or 8 per cent. It is poisonous in large doses, about 45 grains being sufficient to kill a cat.

Nard. See *Spikenard.*

Nardo (när'dō), a town of S. Italy, province Lecce. It has manufactures of textiles. Pop. 11,653.

Nardoo (når-dō'; *Marsilia macrŏpus*), a clover-like acotyldenous plant of Australia, occupying extensive tracts of inundated land. Its dried spore-cases are eaten by the natives.

Nares (nārz), Sir George Strong, Arctic explorer, born in England in 1831. He entered the navy and took part in the Arctic expedition of 1852-54. He served in the Crimean war, and from 1872 to 1874 he commanded the *Challenger* during her celebrated scientific expedition, and in 1875 was first in command of a new North Polar expedition. He afterwards was engaged in a survey of the South Pacific, and was made a vice-admiral in 1892. He was the author of *Seamanship, Reports on Ocean Soundings, Voyage to the Polar Sea,* etc. He died in 1915.

Narghile, or Nargileh (når'gē-lā), a kind of Eastern tobacco pipe, the chief feature of which is that when used the smoke is made to pass through water.

Naro (nä'rō), a town of Sicily, province Girgenti. It has a trade in oil, wine and sulphur. Pop. 12,866.

Narragansett Bay (når-a-gan'set), a bay of the United States, running into Rhode Island for 28 miles. The city of Newport, near its entrance, Providence near its head, and Narragansett Pier, are well-known places of resort on its shores.

Narragansetts, a tribe of Indians which in the early history of New England occupied the part of Rhode Island W. of Narragansett Bay. They were nearly all destroyed during the King Philip's war.

Narrow Gauge, a railroad track of less width than the usual or standard gauge, of 56½ inches between the rails. The narrow gauge has been used in some places for economical reasons, especially where it was difficult to gain a full width of roadbed, but the advantage of uniformity is so great that in the United States the standard gauge is now almost everywhere used.

Narses (nar'sēs), the companion-in-arms of Belisarius, and one of the most successful generals of the Emperor Justinian, was an Asiatic slave and eunuch whom the latter had taken into favor and appointed to a command in 538 A.D. Between that period and 552 he put an end to the dominion of the Goths in Italy, and in 553 was himself appointed exarch, and fixed his court at Ravenna. He was deposed under the Emperor Justinus II, 565, and died at Rome 568.

Narsinghpur (når-sing'pōr), chief town of district of the same name, Central Provinces of India. It is an important center for the grain and cotton trade of the Nerbudda Valley. Pop. 11,233. The district has an area of 1976 square miles, and pop. 315,518.

Narthex. See *Asafetida.*

Narva (når'va), a town of Russia, in the government of St. Petersburg and 79 miles southwest of that city,

on the Narova. Narva is celebrated for the great victory gained by Charles XII in its vicinity over the Russians in 1700. The latter retook the place by storm in 1704. Pop. (1911) 21,478.

Narvaez (nâr-vä'eth), RAMON MARIA, Duke of Valencia, a Spanish statesman and general, born in 1800; died in 1868. Early in life he entered the Spanish army, and he rapidly acquired distinction. When Gomez, the Carlist general, was engaged in his adventurous march through Spain, in 1836, Narvaez, who then commanded a division under Espartero, was directed to pursue him, and totally routed him near Arcos. He then devoted himself to politics, and became the rival of Espartero himself. Having taken part in an unsuccessful rising of the progressista party in 1838, he fled to France and remained there five years. In 1843 he hastened to Spain, put himself at the head of an insurrection, and entered Madrid victorious (July, 1843). In the following year he formed his first ministry, and received from Queen Isabella the rank of marshal and the title of Duke of Valencia. His government was overthrown in 1846, but he was soon recalled, and during the remainder of his life was several times entrusted with the formation of a cabinet.

Narwhal (nâr'hwal; *Monŏdon monocĕros*), a cetaceous mammal found in the northern seas, averaging from 12 to 20 feet in length. The body color is whitish or gray spotted with darker patches. There is no dorsal fin. The dentition of the narwhals differs from that of all other members of the dolphin family. In the female both jaws are toothless, but the male narwhal has two canines in the upper jaw, which are sometimes developed into enormous projecting tusks, though commonly only the one on the left side is so developed, being straight, spiral, tapering to a point, and in length from 6 to 10 feet. It makes excellent ivory. From the frequency with which the narwhal appears as having a single horn it has obtained the name of the *Sea-unicorn*, *Unicorn-fish*, or *Unicorn Whale*. The food of the narwhal appears to consist chiefly of mollusca, and notwithstanding its formidable armature it is said to be inoffensive and peaceable. The Greenlanders obtain oil from its blubber, and manufacture its skin into useful articles.

Narwhal.

Naseberry (nāz'ber-i), the fruit of *Sapōta Achras*, one of the finest West India fruits. See *Sapota*.

Naseby (nāz'bi), a village in Northamptonshire, England, 12 miles from Northampton. In 1645 Fairfax and Cromwell entirely defeated Charles I in the vicinity.

Nash, JOHN, an English architect, born in London in 1752; died in 1835. In 1815 he was made surveyor to the crown estates. He laid out Regent Park, formed Regent Street, and built the United Service Club, Haymarket Theater and Buckingham Palace, London, as also the Pavilion at Brighton.

Nash, RICHARD, known as *Beau Nash*, born at Swansea in 1674; died in 1761. He was master of the ceremonies at Bath, and for many years was sole arbiter of fashion. He died in comparative indigence.

Nash, THOMAS, an English satirist and dramatist, born at Lowestoft, Suffolk, in 1558; died in 1600 or 1601. He was graduated at Cambridge in 1584, but was afterwards expelled for satirizing the authorities. After spending several years on the Continent he returned to London in 1589, and took an active part in the Martin Marprelate controversy, writing several pamphlets on the prelatical side. In conjunction with Marlowe he wrote a drama, *Dido, Queen of Carthage*, and in 1592 produced a comedy of his own, *Summer's Last Will and Testament*, which was acted before Queen Elizabeth.

Nashua (nash'ū-a), a city of New Hampshire, one of the capitals of Hillsboro Co., 35 miles south of Concord, at the junction of Merrimac and Nashua Rivers. It has several extensive cotton manufactories, also iron works, and manufactures of steam engines, locks, guns, tools, shuttles, carpets, etc. Pop. (1910) 26,005; (1920) 28,379.

Nashville (nash'vil), capital of Tennessee and county seat of Davidson Co., on both banks of the Cumberland. The State Capitol is one of the best examples of pure Grecian architecture in the country. Nashville has many institutions of higher learning, including Vanderbilt University, the George Peabody College for Teachers, Ward-Belmont College for young women; Fisk, Walden, and Roger Williams universities for colored students, and other educational institutions. The city is the largest hardwood flooring market in the world, and the largest flour-mixing market. It is also a commercial fertilizer center; has extensive manufactures of stoves and hollow-ware; also hosiery, cotton bags, shoes, candies, overalls, work shirts and many other products. It has the commission form of government. It was settled as Nashborough in 1780; incorporated as Nashville in 1784. Pop. (1910) 80,865; (1910) 110,364; (1920) 118,342.

Nasik (nā'sik), a district in Bombay, British India; area, 5850 square miles. Pop. 816,504. The chief town is Nasik, which ranks among the most sacred places of Hindu pilgrimage.

Nasmith (nā'smith), GEORGE G., a Canadian public health official, soldier, author, 1877-), born in Toronto. He served with the Canadian Expeditionary Forces in France, 1914-18; inventor of protective masks for poison gas, mobile filter, etc. He wrote *Canada's Sons and Great Britain in the World War*, *On the Fringe of the Great Fight*, etc.

Nasmyth (nā'smith), ALEXANDER, a landscape painter, born at Edinburgh in 1758; died in 1840. He went early to London, and studied under Allan Ramsay, painter to George III. He afterwards proceeded to Rome, and on his return to Edinburgh he commenced portrait painting, but soon abandoned it for landscape. His style is remarkable for its simplicity and beauty.—PATRICK, or PETER, son of the former, born at Edinburgh in 1786; died in 1831, was also a painter. Owing to an injury to his right hand he learned to paint with his left. In London, where he became very popular as a painter of English landscape, he was designated the English Hobbema.—JAMES, another son, born in Edinburgh in 1808, was educated at the School of Arts, Edinburgh, and in engineering under Maudsley in London. He removed in 1834 to Manchester, where he became a successful machine constructor and inventor. The steam hammer, which has rendered possible the immense forgings now employed, was invented by him in 1839. The steam pile driver and the safety foundry ladle are among his other inventions. He also acquired fame as a practical astronomer.

Nasr-ed-Deen (nȧsr'ed-dēn), Shah of Persia, born in 1829; succeeded to the throne in 1848. In 1856 his occupation of Herat involved him in war with Britain. Subsequently the two countries were friendly, and he made three journeys to Western Europe in 1873, 1878 and 1889. He was assassinated in 1896, and succeeded by his son, Muz-affer-ed-Deen.

Nassau (nas'sȧ), formerly a state of Germany, now part of the Prussian province of Hesse-Nassau, seized by Prussia in 1866.

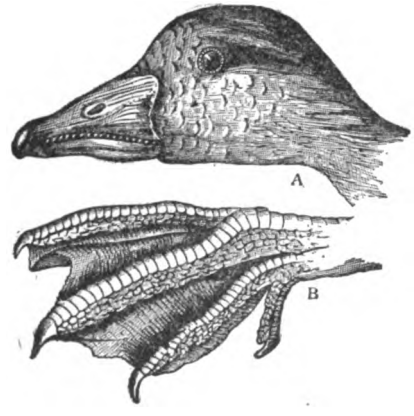
Nassau, capital of the Bahamas, island of New Providence, a handsome city, and a winter health resort for Americans and West Indians. Pop. about 10,000.

Nast, THOMAS, caricaturist, was born in Bavaria in 1840; was brought to the United States in 1846. After service in England and Italy he began drawing war sketches for *Harper's Weekly* in 1862. In his particular line, pictorial satire, Nast stands in the foremost rank. He died in 1902.

Nasturtium (nas-tur'shi-um), or Indian cress, an American climbing annual with pungent fruits and showy orange flowers.

Natal (na-tăl'), a state in the Union of South Africa, on the southeast coast, bounded by the Cape Province on the S. W. and the Transvaal and Orange on the N. W. and with a seaboard of 180 miles on the Indian Ocean. Its area is 34,600 square miles. The only spot where sheltered anchorage can be obtained is at Port Natal, a fine circular bay near the center of the coast. (See *Durban*.) The surface is finely diversified, rising by successive terraces from the shore towards the lofty mountains on its western frontiers. The chief summits are Champagne Castle, 10,357 feet; Mont aux Sources, about 10,000 feet; and Giant's Castle, 9657. The mineral productions are principally coal, ironstone, limestone and marble. Gold has also been found in various localities. The colony is well watered, but none of its rivers are navigable. The climate on the whole is extremely salubrious, and by no means trying to European constitutions. There are large forests on the western and northern frontiers. The soil is generally rich and strong. On the higher forest and table land cattle thrive well; and in the interior wheat, barley, oats, maize, beans and vegetables of almost every de-

scription have been largely and successfully grown. In many parts the vine and fruit trees thrive, and in the coast region generally cotton, tobacco, indigo, sugar-cane and coffee grow well. Tea planting has been recently introduced. The chief exports are coal, gold, wool, sugar, hides and bark. In the less-frequented parts of the interior elephants and lions are still occasionally seen; the leopard is not uncommon, and hyenas, tiger-cats, antelopes, jackals, ant-bears and porcupines are numerous. The hippopotamus has still his haunts in several of the rivers, and there are numbers of small crocodiles. The birds comprise the vulture, several varieties of eagle, the secretary-bird, wild turkey, etc.—Natal was discovered on Christmas Day, 1497, by Vasco da Gama, a Portuguese, and named by him 'Terra Natalis.' The first settlers were the Dutch Boers, who left Cape Colony in 1836, and in 1839 removed to Port Natal and proclaimed themselves an independent republic. The establishment of a hostile settlement at the only port between Algoa and Delagoa Bays was incompatible with British interests, and in 1845 Natal, after a formidable resistance by the Boers, was proclaimed a British possession. In 1856 it was separated from Cape Colony and made a separate colony. Natal was invaded by the Boers in 1881 and again in 1899. Capital, Pietermaritsburg. Pop. estimated at 1,206,386, of whom four-fifths are natives.



NATATORES.
A. Head of Gray Lag Goose.
B. Foot of Domestic Goose.

Natatores (nā-ta-tōr'ēz), the order of swimming birds characterized by a boat-shaped body, usually by a long neck, short legs placed behind the center of gravity so as to act as paddles, toes webbed or united by a membrane to a greater or less extent, close oily plumage to protect them from sudden reductions of temperature from the water, in which they mostly live and obtain their food. The young are able to swim and procure food for themselves the moment they are liberated from the shell. The Natatores include the ducks, geese, swans, flamingoes, the penguins, auks, divers, grebes, gulls, pelicans, cormorants, gannets, frigate-birds, darters, and others.

Natchez (nach'ez), a city, county seat of Adams Co., Mississippi, on Mississippi River, and on the Yazoo & Mississippi Valley, the Mississippi Central, and other railroads, 135 miles above New Orleans. It has steamer connection with all River ports. Has cotton and oil mills, packing plants, planing mills, foundries, etc. Seat of Jefferson Military College and Natchez Institute. Pop. (1910) 11,791; (1920) 12,608.

Natchez, a tribe of Indians formerly residing in the west of the present State of Mississippi, near the Mississippi River. Encroached upon and badly treated by the French who had settled that region, they rose in 1729 and killed all the Frenchmen within their territory. As a result they were attacked and nearly all destroyed, the few who survived being taken and sold as slaves. The Natchez differed from all the other Indians of this country in their political organization, which was that of an aristocracy and class of nobility. Their ruler, known as the Sun, and supposed to be descended from the solar deity, had absolute power of life and death over his subjects. They had temples on high elevations and an intricate system of religion and organization, surpassing that of any other tribe north of Mexico

Natica (nat'i-ka), a genus of gasteropodous molluscs, type of the family Naticidæ.

Natick (nā'tik), a town of Middlesex Co., Mass., 17 miles W. S. W. of Boston. It has extensive boot and shoe manufactures, also baseballs, woodenware, clothing, etc. Pop. 10,907.

Nation (nā'shun; Latin, *natio*, from *natus*, born), either a people inhabiting a certain extent of territory and united by common political institutions, or an aggregation of persons of the same ethnological family and speaking the same or a cognate language. In some universities, as in those of Glasgow and Aberdeen, for instance, the students are divided into 'nations' to distinguish those from different districts or

countries. This custom originated in the University of Paris antecedent to the institution of faculties.

National Airs (nash'un-al), any class of airs peculiarly identified with the music of some particular people, and especially a tune which by national selection or consent is adapted to words which represent or reflect a sentiment, taste, or habit of a nation, and which is usually sung or played on certain public occasions. Examples are: *The Star Spangled Banner*, in the United States; *God Save the King*, in Britain, and the *Marseillaise*, in France.

National Assembly, the legislative body formed in France in 1789, developed from the States General. It was the legislature that inaugurated the French Revolution.

National Bank. See *Bank*.

National Cemeteries. In the second year of the Civil war (1862) the President of the United States was authorized by Congress to purchase national cemetery grounds for soldiers who had died in the defense of the nation. There are 83 of these cemeteries, containing the bodies of 330,700 men—soldiers and sailors. Each grave is marked by a stone tablet. Liberal appropriations are made by Congress from year to year for the proper maintenance of the cemeteries.

National Debt, the sum which is owing by a government to individuals who have advanced money to the government for public purposes, either in the anticipation of the produce of particular branches of the revenue, or on credit of the general power which the government possesses of levying the sums necessary to pay interest for the money borrowed or to repay the principal. The war greatly increased the debts of the nations. The national debt of the United States in 1915 was $3,057,836,000; in 1919 it was $25,482,034,000; Great Britain (1919) about $40,000,000,000; France (1920) about $47,700,000,000.

National Educational Association, formerly National Teachers' Association (founded 1857), a nation-wide organization of teachers in the United States, holding annual conventions. The association has done much to unify the work of educational institutions throughout the country.

National Forest Reserves. Within the decade following 1900 remarkable progress was made by the United States government in setting aside the forest-clad portions of the public lands for the benefit of the people as a whole, definitely withdrawing them from individual occupation. Of the estimated 600,000,000 acres of forest within the country about one-third, or 190,608,243 acres, had thus been set aside by the beginning of 1912. This included 163,777,218 acres within the States, 26,761,626 acres in Alaska, and 65,950 acres in Porto Rico. The idea of conservation has been rigidly applied to this vast forest area, a large number of forest wardens being employed and careful supervision exercised to prevent fires or any wasteful usage. Yet the national forests are put to service. Thus, their forage crop supports cattle, horses, sheep and goats worth $30,000,000, annually. The annual timber crop which they are capable of producing is estimated as worth, on the stump, $10,000,000 more.

National Guard, in the United States, the organized militia of the several states. In 1917, when conscription was enforced in order to provide troops for service in Europe during the great war, the National Guard was disbanded, the personnel having been drafted into the new army of the United States. In France the National Guard was a home-defense organization; it was dissolved after the suppression of the communal revolt in Paris (1871).

Nationalists, the term applied to the Irish political party whose program includes the more or less complete separation of Ireland from Great Britain. See *Home Rule*.

National Institute of Arts and Letters was established in 1898. Qualification for membership, which is limited to 250, is 'notable achievement in art, music or literature.' From this body was organized in 1904 the American Academy of Arts and Letters (membership 50), whose object is 'to represent and further the interests of the fine arts and literature.'

National Insurance. See *Compulsory Insurance*.

National Parks, the public lands of the United States, which, because of their remarkable natural features have been reserved from settlement and set aside for the enjoyment of the general community. The greatest in extent of these is the Yellowstone National Park, in the States of Wyoming and Montana. It embraces about 3348 square miles. A second is the Yosemite Na-

tional Park, in California, of about 1512 sq. miles, remarkable for grandeur and beauty. Sequoia Park, in Tulare Co., and General Grant Park, in Mariposa Co., California, contain the finest specimens of the famous 'big trees' of that State. The Casa Grande Ruin, near Florence, Arizona, is one of the most noteworthy relics of the prehistoric dwellers of the Southwestern United States. Another park takes in the territory of the petrified trees of Arizona, a remarkable example of organic transformation. In addition may be named the Mt. Ranier National Park in Washington, the Crater Lake National Park in Oregon, the Glacier National Park in Montana, and the Rocky Mountain National Park. Canada has the attractive Banff National Park. The United States government has also reserved certain localities on account of their historic interest, including the Gettysburg, Chickamauga, and some other battlefields. See *Yosemite* and *Yellowstone.*

Natron (nā'trun; Na_2CO_3 10 H_2O), native carbonate of soda or mineral alkali, found in the ashes of several marine plants, in lakes in Egypt, and in some mineral springs.

Natron Lakes, several lakes or pools rich in natron in the vicinity of Zakook, a village about 60 miles W. N. W. of Cairo.

Natterjack (nat'er-jak), NATTER-JACK TOAD, the *Bufo calamita,* a species of toad found in various parts of Western Europe, in certain parts of Asia (including Tibet), and not uncommon in England. The general color is lightish-brown, spotted with patches of a darker hue. A line or streak of yellowish tint passes down the middle line of the back. It does not leap or crawl like the common toad, but rather runs, whence it has the name of walking or running toad. It has a deep and hollow voice, audible at a great distance. It is often found in dry situations.

Nattor (nat-tōr'), a town of India, in Bengal, on the Nadar River, an offshoot of the Ganges. Pop. about 10,000.

Natural Bridge (nat'ū-ral) in Rockbridge Co., Virginia, spans a deep chasm, through which a small stream flows, and is formed by an immense limestone stratum fashioned into an arch 215 feet high, length 93 feet, width 80 feet.

Natural Gas, a gas found issuing naturally from crevices in the earth's surface in various localities. It burns like ordinary coal gas, and consists of a mixture of various hydro-carbons, the chief ingredient being marsh-gas (fire-damp). Large deposits have been found in the United States, which are used both for lighting and as fuel. The supply is obtained chiefly from Pennsylvania, West Virginia, Ohio, Kansas, Oklahoma, Texas, Louisiana, California.

Natural History, in its earlier sense, that department of knowledge which comprehends all the concrete sciences, but in more recent times restricted to the science of living things.

Naturalism (nat'yū-ral-izm), a term which in the history of philosophy has been used with a variety of meanings. In general it refers to that which is in accordance with nature. In literature the term refers specifically to the principles and methods of the ultra-realistic school.

Naturalization (nat-ū-ral-i-zā'shun). The laws of the United States provide that to become naturalized an alien must declare on oath before a circuit or district court, or a district or supreme court, or a court of record of any of the States having a seal and a clerk, two years at least prior to his admission, that it is his *bona fide* intention to become a citizen of the United States, and to renounce forever all allegiance and fidelity to any foreign prince, state or sovereignty of which the alien may be at the time a citizen or subject. His full admission to citizenship cannot take effect until he has resided in this country for the continued time of five years preceding his admission, and one year, at least, in the State or Territory in which he makes application. See *Alien.*

Natural Philosophy, originally the study of nature in general; but now commonly restricted to the various sciences classed under *Physics.*

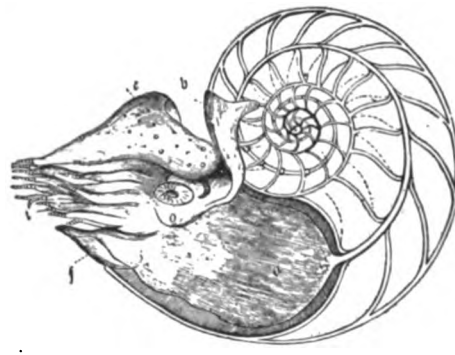
Natural Resources, CONSERVATION OF, a system of protecting and preserving the forests, mines, fisheries, waters and other natural resources of the United States, decided upon by a convention of State governors, held in Washington, D. C., in 1908. These forests were being rapidly depleted by wasteful usage, and a Conservation League was formed to adopt suitable measures for their future preservation.

Natural Selection, a phrase frequently employed in connection with Darwin's theory of the origin of species, to indicate the process in nature by which plants and animals best fitted for the conditions in which they are placed survive, propagate, and spread, while the less fitted die out

and disappear; this process being combined with the preservation by their descendants of useful variations arising in animals or plants. Mr. Darwin's theory takes origin from the fact that all species *vary* to a greater or less extent.

Natural Theology, is that department of ethics which deals with those propositions relating to the existence and attributes of God and the duty of man which can be demonstrated by human reason, independent of written revelation.

Nature Printing, is the art of giving an exact reproduction of natural objects by printing from impressions of the objects themselves formed by pressure on metallic plates. The only objects to which the art can be applied with success are those with tolerably flat surfaces, such as dried and pressed plants, especially ferns and seaweeds, embroidery and lace, the grain of wood, etc.



PEARLY NAUTILUS. (*Nautilus pompilius.*)
a, Mantle. *b*, Its dorsal fold. *c*, Hood. *o*, Eye. *t*, Tentacles. *f*, Funnel.

Naugatuck (nâ'ga-tuk), a borough of New Haven county, Connecticut, on Naugatuck River, 5 miles S. of Waterbury on New York, New Haven & Hartford R. R. It has large rubber works and manufactures of underwear, machinery, copper and iron products, etc. Pop. (1910) 12,722; (1920) 15,051.

Naukratis (nâ'kri-tis), an ancient Greek city in Egypt, which stood on a navigable canal in the western part of the Delta near the Canopic branch of the Nile. It existed as early as the beginning of the seventh century B.C., and had been a place of great splendor. Recent excavations on the site of the city have been productive of highly valuable results.

Naumachia (nâ'mâ'ki-a; from the Greek *naus*, a ship, and *maché*, a fight), among the Romans a public spectacle representing a mock sea-fight. The same term also signified the edifices in which these combats took place.

Naumburg (noum'burh), a town of Prussian Saxony, 18 miles S. S. W. of Merseburg, in the valley of the Saale. One of the principal buildings is the cathedral, partly Gothic and partly Romanesque, completed in 1249. The manufactures consist of combs, playing cards, leather, hosiery, etc. Pop. (1910) 26,462.

Naupactus. See *Lepanto.*

Nauplia. See *Napoli di Romania.*

Nauplius (nâ'pli-us), a term applied to the earliest stage in the development of the lower Crustacea. The naupliiform larva has an ovate unsegmented body, a median eye, and three pairs of limbs. This form is regarded as the primitive form of all crustaceans.

Nausea (nâ'sha), the sensation of sickness, or inclination to vomit, similar to that produced by the motion of a ship at sea. Though the feeling is referred to the stomach, it frequently originates in disorder of other and remote parts of the body, such as the brain, kidneys, womb, etc.

Nautical Almanac. See *Almanac, Nautical.*

Nautilus (nâ'ti-lus), a genus of cephalopods with polythalamous or many-chambered shells. The shell of the pearly nautilus (*N. pompilius*) is a spiral with smooth sides. The turns or whorls are contiguous, the outer whorl covering the inner. The chambers of the shell are separated by transverse septa, and one after the other have been the residence of the animal, being successively abandoned as it has grown. The animal thus always resides in the cavity of its outermost or external chamber. A siphuncle connects the body with the air-chambers, passing through each transverse septum till it terminates in the smallest chamber at the inner extremity of the shell. These internal chambers contain only air. By means of

Nautilus shown in section.

the siphuncle the animal is enabled to sink or swim at will. The nautilus is an inhabitant of the tropical seas. Only three or four existing species are known, though the fossil species exceed a hundred. The name is often loosely applied to the shells of different genera of mollusca. The animal, which has been poetically said to sail in its shell upon the surface of the water, is the paper-nautilus or argonaut. The shell in question, somewhat resembling a sail, is its egg case. See *Argonaut.*

Nauvoo (nạ-vō'), a city of Hancock county, Illinois, founded in 1840 by the Mormons, and afterwards occupied for a time by a company of French socialists. The culture of grapes is the chief industry. Nauvoo is the seat of St. Mary's Academy and Spaulding Institute. Pop. 1020.

Navajo Indians (nä'vä-hō), a tribe of southwestern American Indians of formerly roving and warlike habits, many of whom are now engaged in civilized pursuits. They occupy a reservation in the N. W. of New Mexico and the N. E. of Arizona.

Naval Academy, UNITED STATES, the school at which are educated the executive officers of the navy. It was founded in 1845 at Annapolis, the capital of Maryland, where the Severn River enters the Chesapeake Bay. The first course was for five years, but this was changed to seven years, three of them at sea, in 1849. Early in the Civil War the Naval School was moved north to Newport, Rhode Island, but returned to Annapolis in 1865. Admiral David D. Porter, one of the naval heroes of the war, became its superintendent, and under his excellent rule began the modern Naval Academy.

Since 1912 the students have a four-years' course, during which they are styled midshipmen, and on graduation are commissioned as ensigns. The pay of a midshipman is $780 a year, commencing at the date of his admission to the academy. The course includes mechanical drawing, engineering, algebra, geometry, trigonometry, English, French, Spanish, hygiene, seamanship, boats, steam tactics, signals, gun construction, navigation, ballistics, compass correction, international law, fencing, dancing, swimming, etc. Five midshipmen are allowed for each Senator, Representative and Delegate in Congress, five for the District of Columbia, five for Porto Rico, and fifteen appointed each year from the United States at large. The law authorizes the appointment of one hundred enlisted men each year, to be selected as a result of a competitive examination of enlisted men of the Navy and Reserve Force who have been in the service at least one year, and who are under twenty years of age by August 15 of the year it is desired to enter. All candidates are required to be citizens of the United States and must at the time of their examination for admission be between the ages of sixteen and twenty years; they must be unmarried and any midshipman who shall marry before his final graduation shall be dismissed from the service.

Among the famous buildings on the campus are Bancroft Hall, the Physics and Chemistry Building, the Steam Engineering Building and the Memorial Chapel, under which lies the body of John Paul Jones, brought back from an obscure grave in France through the efforts of General Horace Porter, by a squadron of American men-of-war in 1906. There are such trophies as captured cannon, and the bronze bell brought back from Japan by Commodore Perry. On the Academy campus is Tecumseh, the figurehead of the old frigate *Delaware.*

Naval Advisory Board, a voluntary organization of civilian inventors and engineers constituted by Secretary of the Navy Daniels during the European war 'in order to utilize to the best advantage of our navy a mobilization of the talent and genius of America.' The Board as first established consisted of Thomas A. Edison, chairman, and 22 other members, and met for the first time October 6, 1915.

Naval College of Canada, a school for training naval cadets at Halifax, N. S. Each year a certain number of cadets who have completed their course in the college are entered in the Royal Navy as cadets of the same standing as graduates of the Dartmouth Naval College. Students are not required to adopt a naval career.

Naval Hospitals. See *Hospital.*

Naval Militia, UNITED STATES, an organization supplemental to the naval reserve, with divisions in California, Connecticut, District of Columbia, Florida, Hawaii, Illinois, Indiana, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, Texas, Washington, Wisconsin. Men enlisted in the Naval Militia receive 25 per cent of the base pay of similar active ratings as retainer fee if they attend all prescribed drills, or a proportionate amount if not attending all drills. In order to receive this retainer fee they must enroll in the Volunteer Naval Reserve. The oldest Naval Militia is that of Massachusetts (1890).

CATHEDRAL OF ST. MARY, SALISBURY, ENGLAND

The nave of this famous old cathedral, which is an unsurpassed example of early English architecture. It was built, with the exception of a few details, within the period 1220 to 1266. The spire, 404 feet high, is the tallest in England.

In case of emergency the President may enroll any or all of the Naval Militia into the National Naval Volunteers, who may be drafted into the regular naval service and be subject to the laws.

Naval Reserve, a body of men organized to supplement the regular naval forces in time of war. In the United States six classes of reserves were authorized during the World War: (1) *Fleet Naval Reserve,* composed entirely of ex-service officers and men; (2) *Naval Reserve,* composed of ex-merchant marine officers and men; (3) *Naval Auxiliary Reserve,* composed of officers and men serving on board vessels of the United States merchant marine listed by the Navy Department as desirable auxiliaries and to be taken over as such in time of war, personnel to remain on vessels on which serving when called into active service; (4) *Naval Coast Defense Reserve,* composed of owners and operators of yachts and power boats suitable for naval purposes in defense of the coast; (5) *Volunteer Naval Reserve,* composed of those eligible to serve in any of the foregoing classes, but who obligate themselves to do so without remuneration in time of peace; (6) *Naval Reserve Flying Corps,* composed of those transferred from the Naval Flying Corps.

The British Naval Reserve consists of five classes: (1) Royal Fleet Reserve; (2) Royal Naval Volunteer Reserve, consisting of officers and men in the merchant service but trained in the navy; (3) Pensioners, long-service men; (4) Royal Naval Reserve; (5) Coast Guard. In 1914, at the beginning of the war, there were about 67,000 men and officers in the naval reserve of Britain.

Naval Reserve, Junior, UNITED STATES, an organization for the training of American boys for the United States navy and merchant marine, established during the World War. Boys of from ten to fourteen were admitted to the preparatory camps; the ages for membership in the Junior Naval Reserve being 14 to 18. The first waterside camp school was opened in the spring of 1916 on the Thames River, near London, Conn., and was known as Camp Dewey. Other training camps were located at Corpus Christi, Texas (Camp Paul Jones), and at West Palm Beach, Florida.

Naval Stores, the term applied to products of the pine tree, such as pitch, tar, rosin and spirits of turpentine, originally mainly used in ship construction, but now entering largely into varied industries, chief of which are the manufacture of soap, paints, varnishes, paper, shoe polishes, lubricants, etc. The oldest of American industries, having been established at Jamestown in 1608, in New England as early as 1640, its chief source of supplies for 200 years was the two Carolinas, now exhausted except as to pitch and tar. At present approximately 57 per cent of the crop of rosins and turpentine is produced in Georgia and Florida, 10 per cent in Alabama, and 30 per cent in Mississippi, Louisiana, and Texas. Under normal conditions about one-half of the crop is shipped abroad. France is the next largest producer. Naval stores are also produced in Spain, Portugal, Greece, India and Mexico.

Naval War College, located at Newport, Rhode Island, was established in 1881. Its principal function is to educate officers in the art of war and to prepare plans of operations in conjunction with the General Board, the Office of Naval Intelligence, and the Chief of Operations. It is presided over by a naval officer.

Navarre (nȧ-vär'; Spanish, *Navarra*), a former kingdom, now a province of Spain, between Aragon, Old Castile, and Biscay; area, 4055 square miles; pop. 316,144. Its northern boundary is very mountainous, being composed of the western slopes of the Pyrenees, which, by their numerous streams, supply the Ebro and Ridasson, its principal rivers. Extensive forests clothe the mountain slopes, but the lowlands produce wheat, maize, wines, oil, flax, hemp, and all sorts of leguminous plants, as well as abundant pastures for cattle of every description. Iron, copper, lead, etc., are among the minerals. The capital is Pamplona. The ancient Kingdom of Navarre comprised both the modern Spanish province, called Navarra; and the French portion included in the Basses-Pyrénées since 1607.

Navasota (nav'a-sō'ta), a city of Grimes Co., Texas, 100 miles E. of Austin, on Brazos and Navasota rivers, and on 3 railroads. It has cotton, grain, and pecan-nut interests; cotton gins, oil mills, etc. Pop. 5060.

Nave (nāv), in Gothic architecture, that part of a church extending from the western entrance to the transept, or to the choir and chancel, according to the nature and extent of the edifice.

Navel (nā'vl), or UMBILI'CUS, the aperture or passage in the abdomen which in the adult is normally closed, but in the fœtus or embryo gives passage to the umbilical vessels, by means of which the fœtus communicates with the parent through the placenta. The cicatrization or healing of the navel produces the contracted and depressed appearance

so familiar in the external aspect of the structure.

Navigation (nav-i-gā'shun), the science or art of conducting ships or vessels from one place to another. The management of the sails, rudder, etc., or the working of the ship generally, though essential to the practice of navigation, belongs rather to seamanship, navigation being more especially the art of directing and measuring the course of ships, the method of determining their position, etc., by the laws of geometry, or by astronomical principles and observations. In order to the accomplishment of this the ship must be provided with accurate charts of seas, plans of ports and harbors, etc., compasses, chronometer, sextant, log and log-line, various mathematical instruments, leads and lead-lines, log-book, etc. It is by the compass that the direction in which the ship sails, or should sail, is determined. Though it points in a northerly direction, it does not generally point to the true north, but has a certain variation which must be taken into account. The rate of speed at which a vessel is sailing is found by means of the log, which is heaved usually at the end of every hour. By noting the rate of sailing, the direction of the course, and the time occupied, the ship's position may be estimated, allowance being made for deviation caused by currents, and by the wind driving the vessel to leeward. The position thus determined is said to be found by dead-reckoning. It is not safe to trust to dead-reckoning for any length of time, and a more accurate method of finding the vessel's position at any time is required. This consists in taking observations of the heavenly bodies with the sextant, and these being compared with data given in the Nautical Almanac, while correct Greenwich time is given by the chronometer, the latitude and longitude, or true position, is easily found. In navigating a ship a certain knowledge of trigonometry is required, but the operations can be much shortened by tables and instruments. In directing a ship's course, and applying it on a chart, several methods of what are called *sailings* are employed, as plane sailing (the earth being regarded as having a plane surface), Mercator's sailing, great circle sailing (sailing on a great circle of the sphere), etc.

Navigation, Laws Regarding. After the establishment of the independence of the United States it was natural that a spirit of retaliation should prevail in the framing of the navigation laws. Laws passed in 1790 and 1792 discriminated to such an extent in favor of American shipping as to give a monopoly of the foreign carrying trade. In 1815 a treaty was negotiated between the United States and Great Britain by which the ships of the two countries were placed reciprocally upon the same footing in the ports of the United States and Great Britain. The shipping act of 1884 placed the sailing fleet of the United States on an equality with the vessels of other flags as regards the expenses of navigation. Consular fees are abolished, and consuls are paid by the government. The further payment of advance wages to seamen was prohibited. The 'limited liability act' provides that the individual liability of a ship owner, for the ship's debts, except for wages due to persons employed by the owners, shall be limited to the proportion of his interest.

Navy (nā'vi), a collective term for all the ships, or all of a certain class belonging to a country. Thus we may speak of the mercantile navy of a country; but the term by itself means the whole of the ships of war belonging to a nation; or the whole naval establishment of any country, including ships, officers, men, stores, etc. The organization of a national naval force in England is assigned to Alfred the Great; but it was not till the time of Henry VIII that a regular shape was given to the Royal Navy as a standing force. In his reign an admiralty office was established and public dockyards opened at Woolwich, Deptford and Portsmouth. In the reign of Elizabeth the naval power of England was increased by charters and money grants given to merchant adventurers, trading companies and privateers. Classing ships by rates or ranks based on their relative fighting power appears to have become well established during the Commonwealth, when the navy attained great importance; and a similar classification prevailed up to the middle of the present century. When George I came to the throne the navy consisted of 178 ships, ranging from about 374 tons burden to one of 1869 tons, carrying 100 guns. Two leading qualities now stood forth as the most important object to be attained in the construction and equipment of vessels for war—strength of offensive armament, and speed and facility of manœuvring. These qualities gained in relative importance at the expense of a previously preponderating element of equipment, namely, the number of fighting men available for assault at close quarters. Two classes of vessels, according to the preponderance of one or other of these qualities, thus came to constitute at this time the chief strength of fleets. The ship of the line, or first class war vessel, carried the

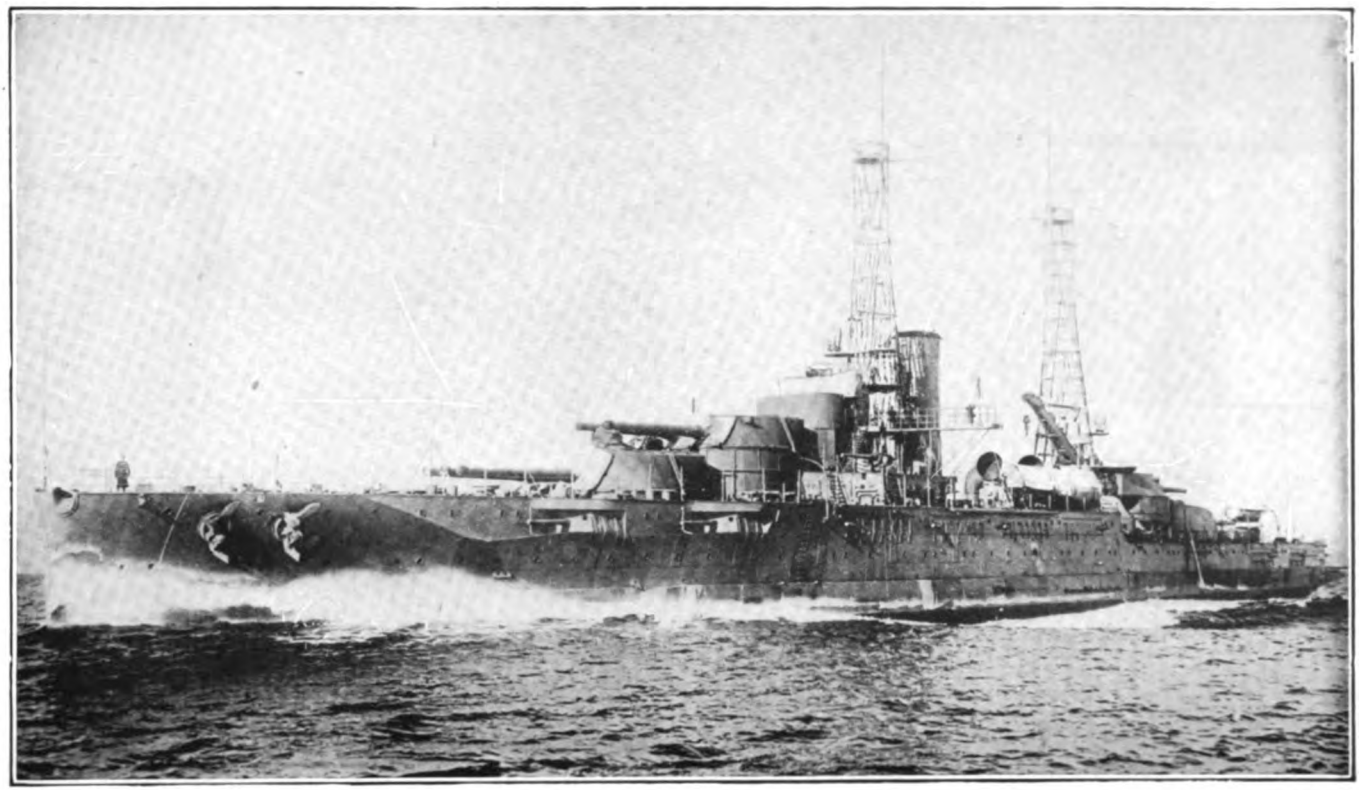


Photo by Underwood and Underwood, N. Y.

UNITED STATES BATTLESHIP "OKLAHOMA"

One of the latest types of super-dreadnought is here shown, racing along at 20½ knots an hour on a speed test. This great warship is a sister-ship of the "Nevada." Her displacement is 27,500 tons, her engines develop 28,000 horsepower and she is armed with ten 14-inch guns in her four turrets, twenty-one 5-inch and four 3-pounders, together with four 21-inch torpedo tubes. She cost over $6,000,000.

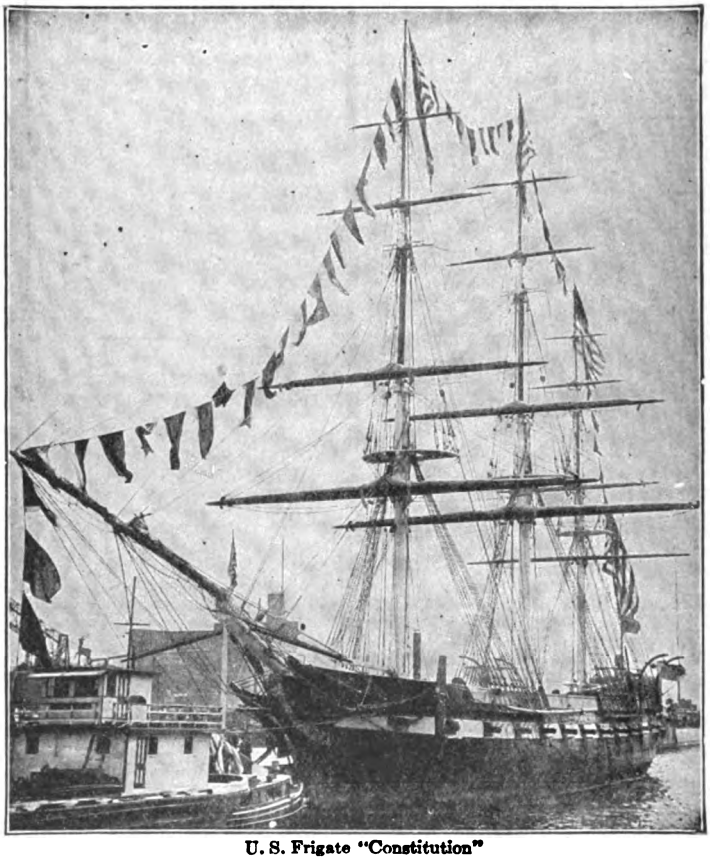
strength of offensive equipment to the utmost limit practicable without sacrificing sea-going qualities. The frigate, excelled in strength only by a line-of-battle ship, was built and rigged with every artistic appliance to secure speed. The great point in a first-class vessel was the weight of broadside, and a hundred or more guns on three decks were commonly carried. In a pitched battle it was the line-of-battle ships that bore the brunt of the fight and decided the day. The frigates scoured the seas on special missions, escaped from the enemy's line-of-battle ships by speed, destroyed his privateers, and protected the commerce of their own country. During all the great European wars these were the leading types of vessels employed. In the early part of the nineteenth century Britain had usually over 100 ships of the line and about 150 frigates in commission, besides an equal number of sloops and other vessels, measuring 800,000 to 900,000 tons in all. Between 1814 and 1859 steam was gradually substituted for sailing vessels in the navy; and in the latter year the French *Gloire* was launched, famous as the first sea-going iron-clad, although Col. John Stevens, of New Jersey, drew plans of such a craft as early as 1812. For a short time the United States had a strong navy; this was during the period of the Civil War. On the conclusion of the struggle, the principle of economy was acted upon and the navy steadily declined until after 1880 when practically all of the navies of the world began to be strengthened, and the United States embarked on a new building program. From that time till the outbreak of the World War, in 1914, navies continued to grow. Britain, in competition with Germany and other powers, built up a navy equal to that of any two other powers. Germany had laid plans for an enormous navy, which was to have been completed in 1923. The defeat of Germany in 1918 and her surrender of her fleet eliminated her as a naval power. Russia suffered severely in the Russo-Japanese war; and the success of Japan aided in her plans to build up a first-class navy, eventually ranking third among naval powers in 1920. The navy of France, owing to frequent changes of government and policy, has never been very strong. It ranks with the Italian navy which latter was aided by the defeat and surrender of the Austrian navy (1918). Turkey and Russia were also eliminated as naval powers. During the war the United States planned a program that was intended to make the American navy second to none. Among the smaller navies may be mentioned those of Greece, Netherlands, Spain, Argentine, Brazil, Chile, etc. The total personnel of the navy of the Argentine Republic is 9000 men; Brazil, 10,000; Chile, 5000; Cuba, 1000; Germany, not to exceed 15,000; Portugal, 6000; Spain, 15,000; Sweden, 6000 men.

The five-power naval treaty adopted at the Armaments' Limitation Conference (q. v.) in February, 1922, was the first definite step taken to end the competitive building among the great powers by limiting the tonnage of the several navies to: United States, 525,850 tons; Britain, 558,950 tons; Japan, 301,320 tons; France, 221,170 tons; Italy, 182,800 tons. The total capital ship replacement is not to exceed: United States and Britain, 525,000 tons each; Japan, 315,000 tons; France and Italy, 175,000 tons each.

Navy, DEPARTMENT OF THE, one of the executive departments of the Government of the United States, created by Act of Congress April 30, 1798, the control and naval affairs having previously been one of the duties of the Department of War. The chief official of the department is a Secretary of the Navy, appointed by the President with the advice and consent of the Senate, and forming a member of the President's cabinet. The President being, by direction of the Constitution, commander-in-chief of the Army and Navy, the Secretaries of both these departments are in general matters subject to his direction. But there are a number of specific duties imposed upon the Secretary by law concerning which he is not under the direction of the President. Thus, in common with the heads of the various government departments, it is his duty to make an annual report to the President of the operations of his department. The Assistant Secretary, also appointed by the President, performs his duties when from any cause he is absent or unable to act, and since 1880 there has been a Judge Advocate General of the navy who is in charge of courts of inquiry, courts martial, or any other legal proceedings which may arise. On July 5, 1862, eight bureaus were established in the Navy Department, each with a chief official appointed by the President from among the officers of the navy. These bureaus are those of Yards and Docks, Equipment, Navigation, Ordnance, Construction and Repair, Steam Engineering, Medicine and Surgery, and Supplies and Accounts. The European war added vastly to the activities of the department, large numbers of vessels being built for warlike, transportation, and various other duties.

Navy of the United States. The Navy came legally into existence on December

22, 1775, by act of the Continental Congress then in session. Thirteen ships, representing the thirteen colonies, were ordered to be built, the largest of them to carry 32 guns. For immediate use a number of smaller vessels were purchased, two



U. S. Frigate "Constitution"

of them ships, renamed the *Albert* and the *Columbus*. Esek Hopkins, brother of the Governor of Rhode Island, was put in command of this modest squadron, while Lieutenant Paul Jones had the honor of raising to the masthead of the *Albert* the banner of the colonial union, a flag of thirteen stripes alternately red and white, with the British Union Jack on the field. The "red, white and blue" United States standard had not yet come into existence. Of those who took part in that ceremony Paul Jones alone won a distinguished place in history as the hero of the world-famed fight between the *Bonhomme Richard* and the *Serapis*. The other vessels, with a large number of privateers, were chiefly engaged in making prizes of British merchantmen.

A new movement in this direction was made on June 6, 1794, when the present United States Navy was organized, Captain John Barry being appointed its first commodore. Four years later the Navy Department of the American Government began its career. The principal ships in the navy as then formed were the frigates

Constitution, *Constellation* and *United States*. By the end of 1799 there were 5 frigates and 23 ships of war in commission. These were needed, for a naval war had begun with revolutionary France, whose cruisers were seizing American merchantmen without regard to the character of their cargoes, if bound to ports hostile to France. These piratical operations ceased when the *Constellation*, Captain Truxton, had handled a few of the French cruisers severely, and the same was the case at a later date with the corsairs of Algiers and Tripoli, which had sought to put American commerce under tribute. Great Britain followed in the same direction during the Napoleonic wars, stopping American vessels on the high seas and taking sailors from them to serve in its ships, on the plea that these were British subjects. This in the end led to war between the two countries, a contest in which the American navy did admirable work, capturing or sinking numbers of the best British frigates while the American armies usually found themselves overmatched.

Between this period and that of the Civil war in the United States, the war vessels of this and other countries were steadily growing larger and more powerful and the number and caliber of their guns increasing, while steam power had taken the place of wind and sails as means of propulsion. And while the war in question was for the most part fought on land, the navy was by no means idle, alike in the work of blockade and that of attack on the ports of the Confederate States by war vessels of the North. The powers of offense had grown so great that increased means of defense became more and more urgent. Wooden walls could no longer be trusted as ramparts of defense, and the need of putting something more resistant than wood in the way of the piercing ball and the exploding shell became evident. The first ironclad was not of American origin. One was built in France in 1859, and another, the *Warrior*, was launched in England in January, 1861, the latter covered above the water line with 4½-inch iron plates. When this new conception in naval architecture crossed the ocean it was first tried out in the South, a Mississippi tugboat being cut down nearly to the water's edge and covered with a rounded roof, which was plated with 1½-inch bars of iron. It came out October 31, 1861, but did no more harm than to cause a spasm of fright and a hasty flight in the vessels guarding the channel.

Such were the initial steps in the production of armored warships. Work of the same kind was quickly under way in the North, alike by the Unionists and the Confederates. The latter had raised a ship sunk at the Norfolk Navy Yard, covered it with a sloping roof of heavy timbers, placed over this iron plates 4 inches thick, and armed it with a battery of 9-inch and 7-inch guns. This formidable floating fort—for that period—was sent out in March, 1862, to deal with a squadron of old type wooden war vessels in Hampton Roads. Fortunately for the Union government, it was prepared to meet the *Merrimac*, as thus reconstructed. A new type of iron-clad vessel, the invention of John Ericsson, was at this time on its way south. The *Monitor*, as this was called, was a low-lying craft, its armored sides rising little more than a foot above the water level. Above this was a revolving circular turret, 20 feet in diameter and 9 feet high, covered with 8-inch iron plate, and carrying two 11-inch smooth-bore guns, firing solid shot of about 180 pounds weight. Such were the two strangely appearing ships that were to fight the first battle of ironclads in the world's naval history. What followed is familiar to American readers. The *Merrimac* made havoc among the wooden ships and fear was entertained that it would ascend the Potomac and bombard Washington. But it was checked in its career by the *Monitor* and forced to return to its base. Such was the brief but effective hostile career of these primitive iron monsters of the wave. The *Merrimac* never came out again. The *Monitor* was later sunk in the open sea. But they had demonstrated one important fact: the day of the wooden warship, which had ruled the waves for thousands of years was at an end. Iron and steel ships were to take its place, and all haste was made to plate with iron the craft of the Mississippi and its affluents and fit them for the work of running the gauntlet of the Confederate river ports.

This must suffice to tell the story of naval progress in the United States during the Civil war. The types of vessels that fought the first battle of ironclads were not successful. Nothing like the *Merrimac* reappeared. New *Monitors* were built, and some still exist, but they have been superseded by vessels of the older type, though retaining the one useful element of the *Monitor* class—the revolving turret, with its heavy guns. After the war in question the United States for years paid little attention to naval construction, but all the nations of the earth had been taught a lesson by the Hampton Roads battle and steel-clad ships, of steadily increasing size and weight of

gunfire, took the place of the older wooden warship.

It was not until the period approaching the Spanish war that the United States Government awoke fully to the need of keeping step with the other nations, especially with Great Britain and Germany, in its naval progress. That war taught no new lessons, other than the fact that, as matters stood, the United States needed what was practically a double navy, one for the Atlantic and a second for the Pacific. It was an object lesson in the necessity of closer connection between these two oceans, one which has since been realized in the construction of the Panama Canal. Navy yards have since been opened at various parts of the coast-line until ten of these were in existence by the end of 1917. The organization of the navy changed from time to time in personnel and establishment; battleships, cruisers, torpedo boats, destroyers, and submarines (the latter an American invention) were produced, all steel-clad, and the battleships and cruisers rapidly growing in size and weight of armament, and the Delaware River at Philadelphia and in its vicinity became one of the greatest ship-building localities on the earth. While the navy of Great Britain remained much in advance of any of its competitors, those of the United States and Germany closely approached each other in strength and importance. As for the famous British dreadnought of 1906 (17,900 tons), this has been so greatly surpassed that ships of almost double this tonnage are now afloat, while the 12-inch gun has now grown into guns of 16-inch caliber, with a corresponding increase in weight of missiles.

The tonnage of the United States Navy up to the end of 1916, as compared with those of Great Britain and Germany of July 1, 1914, was as follows: United States, 1,097,502; Great Britain, 2,713,756; Germany, 1,304,640 tons. Of these Great Britain had 36 of and above the dreadnought type; Germany, 20; United States, 17. Following the entrance of the United States into the Great War an extensive building program was entered upon; four dreadnoughts of 32,600 tons each were to be laid down in 1917-18; and no fewer than six super-dreadnoughts, of 43,200 tons each were to be laid down in 1919-20. Only the early ending of the war and the subsequent Armaments' Limitation Conference (q. v.) prevented the United States from having by far the greatest navy of the world. On April 6, 1917, the day the United States declared war on Germany, there were 364 vessels on the navy list, and the regular navy comprised 64,680 enlisted men and 4376 officers. On the day the armistice was signed, November 11, 1918, there were no fewer than 2003 vessels in the service of the navy, and the total personnel had been increased to 507,607 enlisted men and 32,052 officers. Including the reserves and marines, yeowomen and civilian employees, there were more than 700,000 men and women under the naval establishment. Besides the war against the German submarines, and the naval convoys, the American navy took an active part in the blockade of Germany, in connection with the British fleet, and also operated the transportation service which grew during the war from 10 ships to a fleet of 321 cargo-carrying ships with a deadweight tonnage of 2,800,000 tons.

In accordance with Article 2 of the five-power naval treaty adopted at the Armaments' Limitation Conference (q.v.) in February, 1922, the ships which may be retained by the United States are: *Maryland, California, Tennessee, Idaho, New Mexico, Mississippi, Arizona, Pennsylvania* (all over 30,000 tons), and the *Oklahoma, Nevada, New York, Texas, Arkansas, Wyoming, Florida, Utah, North Dakota, Delaware* (under 30,000 tons); a total of 500,650 tons. On the completion of two ships of the *West Virginia* class (32,600 tons each), and the scrapping of the *North Dakota* and *Delaware*, the total tonnage of the United States will be 525,850. The total capital ship replacement tonnage of the United States shall not exceed 525,000 tons. This equals the displacement tonnage allowed Great Britain. For France the tonnage is placed at 175,000; for Italy, 175,000 tons; and for Japan, 315,000 tons.

The United States Marine Corps is a branch of the military service which is under the direction of the Secretary of the Navy. Popularly termed the 'soldiers of the sea,' they protect government property and naval stations at home, and furnish the first line of defense of naval bases and stations beyond the limits of the United States. They go with the warships, act as landing parties at shore, and are used as expeditionary forces and for advance duty. The Marine Corps was first called into existence during the Revolutionary War. It was disbanded at the close of the war, but was reorganized in 1798. It has participated in every expedition and action in which the navy has engaged, and has co-operated in campaigns with the army. In the Great War the Marines played a vital part in holding the German drive near Chateau-Thierry. For their valiant work in capturing Belleau Wood the French renamed the Wood 'Bois de Brigade des Marines.'

Navy Yards, establishments for the construction, equipment and repair of vessels of the navy. The principal navy yards of the United States are at Boston, Mass.; Charleston, S. C.; Mare Island, Cal.; Brooklyn, N. Y.; Portsmouth, Va.; Philadelphia (League Island), Pa.; Portsmouth, N. H.; Bremerton (Puget Sound), Wash.; and Washington, D. C. There is a naval operating base at Hampton Roads, Norfolk, Va. In England the term 'dockyard' is used for 'navy yard.' See *Dockyards*.

Naxos (nāks'os), or NAXIA, an island of the Grecian Archipelago, the largest of the Cyclades, length 18 miles; breadth, 12 miles; area, 170 square miles. It is hilly, but extremely productive. Pop. about 18,000.

Nazareth (naz'ā-reth), a small town in Palestine, 65 miles N. of Jerusalem, is celebrated as the residence of Jesus during his youth. It is surrounded on all sides by hills. The houses, which are of stone, are well built, with flat roofs. The principal edifices are the conventual buildings of the Franciscan monks, which include the Latin Church of the Annunciation. Pop. about 11,000.

Nazarites (naz'ăr-īts), or NAZIRITES, among the ancient Jews, persons who devoted themselves to the peculiar service of Jehovah for a certain time or for life. The law of the Nazarites (from the Hebrew *nazar*, to separate) is contained in Numbers vi. 1-21.

Nazimova (na-zē'mō-vâ), ALLA, a Russian-American actress, born at Yalta, Crimea, in 1879. She made her début in New York as *Lia* in the Russian play 'The Chosen People.' Subsequently she mastered the English language, and appeared with great success in such plays as 'Hedda Gabler,' 'A Doll's House,' 'The Master Builder,' 'Bella Donna,' 'War Brides,' etc.

Neagh, LOUGH (loh nā or nā'ăh), a lake of Ireland, the largest in the British Isles, being 19 miles long by 12 miles broad, and covering an area of 153 square miles. It washes the counties of Antrim, Armagh, Tyrone and Londonderry. Its waters are well known for their petrifying properties.

Neal (nēl), DANIEL, an English dissenting clergyman, born in 1678; died in 1743; long pastor of a church in London. He wrote a *History of New England* and other works, but is best known by his *History of the Puritans* (1732-38).

Neale (nēl), JOHN MASON, clergyman of the English Church, born in 1818; died in 1866. He belonged to the High Church party, and was a voluminous writer, among his works being *History of the Holy Eastern Church: Essays on Liturgiology and Church History; Mediæval Hymns from the Latin; Hymns of the Eastern Church*, etc. He wrote a number of popular hymns.

Neander (nā-an'dĕr), JOHANN AUGUST WILHELM, a Protestant theologian, born of Jewish parents at Göttingen in 1789; died at Berlin in 1850. He was early converted to Christianity, and was appointed extraordinary professor of theology at Heidelberg in 1812. In the same year, however, he accepted an invitation to the University of Berlin, where he spent the remainder of his life in uninterrupted labors for the good of the church and general learning. His chief works are his *Life of Christ*, in refutation of Strauss; his *General History of the Church;* and his *History of the Apostolic Church*.

Neanderthal Man (nā-an'dĕr-tal), the fossil remains of a man which were found in a limestone cave in Neanderthal Valley, Prussia, and remarkable for their bestial characteristics. The skull is of peculiar form and less human and more Simian than any other known until very recently. Many archæologists hold it to be distinctive of a type of very ancient cave dwellers, while others maintain that its character is the result of abnormal conditions in the individual. Later discoveries of antique human remains of somewhat similar type, and especially the finding of a still more simian-like skull in Java, go far to sustain the former view.

Neap-tides (nēp-tīdz), tides which happen in the middle of the second and fourth quarters of the moon. They are the lowest tides. See *Tide*.

Nearing (nēr'ing), SCOTT, an American sociologist, born at Morris Run, Pennsylvania, in 1883. He gained his Ph. D. at the University of Pennsylvania in 1909. He was instructor of economics at Swarthmore, 1908-13; instructor and later assistant professor of economics at University of Pennsylvania, 1906-15. Author of *Social Adjustment, Wages in the United States, Social Religion, Anthracite, Poverty and Riches, The American Empire*, etc.

Neath (nēth), a town and river port on the Neath, in South Wales, in the county of Glamorgan, 7 miles E. N. E. of Swansea. It carries on a considerable trade, and the industries include copper smelting, tinplate-working, and the manufacture of chemicals. Near the town are the remains of Neath Castle and Abbey, both erected in the twelfth century. Pop. (1911) 17,586; (1921) 18,936.

Nebo (nē'bō), or NABU, an ancient Assyrian and Babylonian deity, lord of the planet Mercury, and ruler

of the hosts of heaven and earth, according to Babylonian inscriptions, especially honored in Borsippa. Statues of Nebo have been found in Nineveh, showing him with long beard and hair, and clad in a long robe.

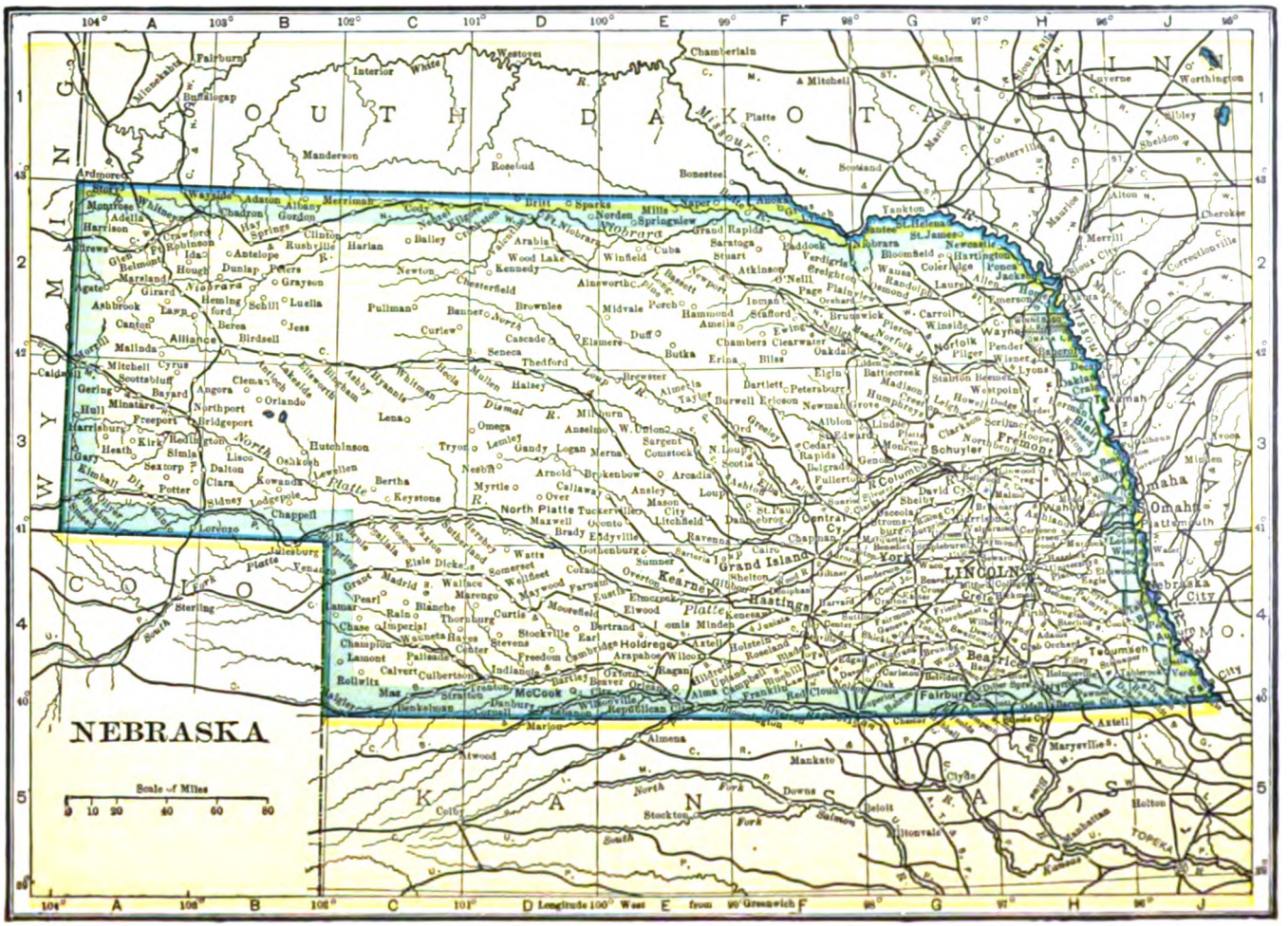
Nebo.

Nebraska (nē-bras'-kà), one of the United States, bounded on the N. by South Dakota, E. by Iowa and Missouri, S. by Kansas and Colorado, and W. by Colorado and Wyoming. Area 77,530 sq. miles. The greater part of the State consists of gently undulating land with a slight inclination to the eastward. On the N. W. is a desolate tract known as the Mauvaises Terres, of Bad Lands, rich in interesting fossil remains. Timber is scarce. The principal rivers are the Missouri, which forms the boundary on the east; its great affluent, the Platte, which, formed by two main forks, a northern and a southern, both from the Rocky Mountains, traverses the territory in an eastern direction; the Niobrara, which traverses the north and flows into the Missouri; and the Republican fork of Kansas River, traversing the southern part of the State. The climate is temperate, the mean temperature in summer being 70° to 74°, in winter from 22° to 30°. The atmosphere is dry, and the rainfall diminishes from east to west, being 18 inches at North Platte and 31 inches at Omaha. The soil, except in the northwest and southwest, is a deep rich loam underlaid by a porous clayey subsoil, and is thus admirably adapted to withstand drought. The principal crops are maize, wheat, oats, barley, potatoes, alfalfa and hay. The west is mainly adapted to grazing, and stock raising is largely carried on, cattle and horses requiring little protection or hand-feeding during winter. Manufactures are as yet generally restricted to the supply of local wants. The railway system centers in Omaha, the chief city, the Burlington, the Northwestern, and the Union Pacific Railways passing through the State. Limestone, sandstone and gypsum are abundant. The chief towns are Omaha (by much the largest) and Lincoln (the State capital). At the head of the educational establishments stand the University of Nebraska at Lincoln, the University of Omaha, Cotner University at Bethany, Wesleyan University at University Place, and Doane College at Crete. There are graded and high schools supported by general and local taxation, and a generous share of the public lands has been set apart for educational purposes. There are four State normal schools. Nebraska came into the possession of the United States as part of Louisiana in 1808, was recognized as a separate territory in 1854, and admitted into the Union as a State in 1867. Pop. (1900) 1,066,300; (1910) 1,192,214; (1920) 1,296,372.

Nebraska City, a city, county seat of Otoe Co., Nebraska, on the Missouri River, on the C., B. & Q. and the Mo. Pac. railroads, about 53 miles S. of Omaha. It has a good river and railroad trade and a variety of manufactures. Here is the State institution for the blind. Pop. (1920) 6279.

Nebuchadnezzar (neb-ū-kad-nez'-ar; in Jeremiah and Ezekiel, *Nebuchadrezzar;* Greek, *Nabuchodonosor*), a king of Babylon, celebrated as the conqueror of Judah. He reigned from 604 to 561 B.C. according to the opinion of modern chronologists, or from 606 to 563 B.C. according to that of older chronologists. He was the son of Nabopolassar, by whom the kingdom of Babylon was definitely made independent of the Assyrian monarchy. In the fourth year of Jehoiakim, king of Judah (605-4 B.C.), he defeated Pharaoh-Necho, king of Egypt, at Carchemish (Circesium), on the Euphrates, after which he subjugated Syria and Palestine, carrying off with him the sacred vessels of the temple and the chief Jews into captivity. He destroyed Tyre in 585, and some years later he invaded and ravaged Egypt. During the peaceful years of his reign he rebuilt in a magnificent manner Babylon and many of the other cities of the empire, and constructed vast temples, aqueducts, and palaces, whose ruins still testify to his grandeur. His insanity and the events preceding are only known to us from the book of Daniel. Several inscriptions relating to his reign have recently been found.

Nebula (neb'ū-la), pl. NEBULÆ, in astronomy, the name given to certain celestial objects resembling white clouds, which in many cases, when observed through telescopes of sufficient power, have been resolved into clusters of distinct stars. As more and more powerful telescopes have been employed the number of resolvable nebulæ has become greater and greater, and it is probable that many nebulæ irresolvable at


NEBRASKA
Scale of Miles
0 10 20 40 60 80
Longitude 100° West from Greenwich
SOUTH DAKOTA
WYOMING
COLORADO
KANSAS
MISSOURI
IOWA
MINN.
Missouri R.
Niobrara R.
Platte R.
Republican R.
Big Blue R.
Little Blue R.
Loup R.
Elkhorn R.
Omaha
Lincoln
Grand Island
Hastings
Kearney
North Platte
McCook
Fairbury
Nebraska City
Beatrice
York
Fremont
Schuyler
Norfolk
Wayne
Hartington
Yankton
Sioux City
Scottsbluff
Alliance
Chadron
Valentine
Ainsworth
Broken Bow
Ord
Gothenburg
Holdrege
Superior
Hebron
Falls City
Tecumseh
Auburn
Blair
Fairmont
Geneva
Seward
Milford
Crete
Wahoo
Ashland
Plattsmouth
Omaha
Council Bluffs
Sioux City
Yankton
Topeka
Kansas City

present may yet be shown to be star clusters by telescopes more powerful than those now employed. On the other hand, the spectroscope has shown that many nebulæ, among which are several that had hitherto appeared to be well authenticated clusters, consist, in part at least, of masses of incandescent gas. The recent researches of Mr. Norman Lockyer render it probable that nebulæ include clouds of meteors, which, by their continual impact against one another, produce the heat, light, and gaseous matter that are detected by our telescopes and spectroscopes. A few of the great nebulæ, such as those of Orion, Argo Navis and Andromeda, are visible to the naked eye; but most are telescopic, and of these thousands are now known to astronomers. Nebulæ have been classified as follows:—(1) *Resolvable nebulæ*, and such as apparently only require instruments of increased power to resolve them into separate stars; (2) *Irresolvable nebulæ*, showing no appearance of stars; (3) *Planetary nebulæ*, so called because they slightly resemble in appearance the larger planets; (4) *Stellar nebulæ*, those having in their center a condensation of light; and (5) *Nebulous stars*, a bright star often seen in the center of a circular nebula, or two bright stars associated with a double nebula, or with two distinct nebulæ near each other.

Nebular Hypothesis (neb'ū-lâr hī-poth'e-sis), a theory by means of which Laplace (before the existence of nebulous matter in the universe had been discovered by means of the spectroscope) accounted for those features of the solar system which must be regarded as accidental in the Newtonian philosophy. This theory supposes that the bodies composing the solar system once existed in the form of a nebula; that this had a revolution on its own axis from west to east; that the temperature gradually diminishing, and the nebula contracting by refrigeration, the rotation increased in rapidity, and zones of nebulosity were successively thrown off in consequence of the centrifugal force overpowering the central attraction. These zones being condensed, and partaking of the primary rotation, constituted the planets, some of which in turn threw off zones which now form their satellites. The main body being condensed towards the center, formed the sun. The theory was afterwards extended so as to include a cosmogony of the whole universe. Serious objections have been made to the hypothesis and rival theories of recent origin have been advanced.

Necessity (ne-ses'i-ti), a word used in philosophical and theological discussions with varying senses, but very commonly implying the operation of a blind fate or destiny, and absence of free will. See *Will*.

Necho (ne'kō), or NEKU, a king of Egypt, mentioned in 2 Kings xxiii, 29 and Jerem. xlvi, 2. He belonged to the twenty-sixth dynasty; succeeded his father Psammeticus I, and reigned from B.C. 610 to 594. He extended his dominions from the S. of Syria to the Euphrates; defeated Josiah, king of Judah, at Megiddo, but was ultimately driven back by Nebuchadnezzar.

Neck, the part of an animal's body which is between the head and the trunk, and connects them. The bones of the neck in man, and in nearly all other mammals, are the seven cervical vertebræ.

Neckar (nek'âr), a river of Germany which rises in the Black Forest, in Würtemberg, and flows through Baden into the Rhine at Mannheim, after a course, including windings, of about 240 miles. It is navigable half its course for small vessels.

Necker (nek'èr), JACQUES, a French minister of finance, born at Geneva in 1732; died in 1804. He became clerk in a Paris banking house in 1750, and afterwards accumulated a large fortune as a banker. In 1776 he received an appointment to the treasury,

Necker.

the direction of which he retained for five years. Malversation under the preceding reign had caused a large deficit, to which the American war made great additions. Necker endeavored to meet

the exigency by loans and reforms, and above all to fund the French debt and establish annuities under the guarantee of the state. His suppression of abuses had created him many enemies at court, and shortly after the publication of his famous *Compte Rendu*, in which he furnished a clear statement of the condition in which he had found things, of what he had done and what he intended to do, he resigned and retired to Switzerland, where he published his *Administration of the Finances*, which had an immense circulation. The errors of Calonne, who next had the management of the state finances, increased Necker's reputation; and in 1788 he was recalled as controller general. His convictions led him to support the convocation of the States General and the giving a double representation to the *tiers état*. The States General were actually summoned to meet on May 1, 1789; but not long after the advisers of the king succeeded in inducing him to give Necker his dismissal, and to order him to leave the kingdom. No sooner was his removal known than all Paris was in a ferment. The storming of the Bastille followed (July 14), and the king found himself compelled to recall the banished minister. His return to Paris resembled a triumphal procession. His first object was to restore tranquillity and security of person and property. But he was not equal to the political or even the financial crisis, and resigned in September, 1790. He passed the rest of his life in Switzerland, where he occupied himself in writing political and religious treatises. Necker's daughter was the well-known Madame de Staël.

Necromancy (nek'ru-man-si), the divination of the future by questioning the dead. This superstition originated in the East, and is of the highest antiquity. We find mention made of necromancy in the Scriptures, where it is strongly condemned. In the Odyssey Homer has made Ulysses raise the shade of Tiresias from the infernal regions. In many parts of Greece there were oracles of the dead, the origin of which is lost in the obscurity of history. Although this practice has been condemned by the Christian Church from the very first, it has not yet entirely ceased. The term is often extended so as to include the general art of magic.

Necroph'orus. See *Burying-beetle.*

Necropolis (nek-rop'u-lis; literally, 'city of the dead'), a name originally applied to a suburb of Alexandria devoted to the reception of the dead, and hence extended to the cemeteries of the ancients generally. The name has also been given to some modern cemeteries in or near towns.

Necrosis (nek-rō'sis; literally, 'mortification'), a medical term signifying the death of the bone substance. It is a condition of the bone substance corresponding to what gangrene is in the soft parts, thus distinguished from *caries*, which corresponds to ulceration in the soft parts. Necrosis is usually a result of inflammation of the bone, and is often attributed to cold, but frequently it is due to constitutional disease.

Nectandra (nek-tan'dra), a genus of forest trees, natives of South and Central America. See *Greenheart.*

Nectar (nek'tar), in Greek mythology, the drink of the gods, which was imagined to contribute much towards their eternal existence. It was said to impart a bloom, a beauty and a vigor which surpassed all conception, and together with ambrosia (their solid food) repaired all the decays or accidental injuries of the divine constitution.

Nectarine (nek'târ-in), a fruit which differs from the peach only in having a smoother rind and firmer pulp, being indeed a mere variety of peach. See *Peach.*

Nectary (nek'tâ-ri), the name given by Linnæus to every part of a flower that contains or secretes a saccharine fluid, or even to every abnormal part of a flower.

Nectocalyx (nek-tō-kal'iks), in zoology, the swimming-bell or disk of a medusa of jelly-fish, by the contractions of which it is propelled through the water.

Needham (nēd'am) a town of Norfolk Co., Massachusetts, 10 miles s. w. of Boston. It has manufactures of hosiery, knit-goods and other products. It was incorporated in 1711. Pop. (1920) 7012.

Nedjed. See *Nejd.*

Needell (nē'del), Mary Ann, novelist, born at London, England, in 1830. She published *Ada Gresham* in 1851, and after 1881 numerous novels, the best-known being *Julian Karslake's Secret* (1881); *Stephen Ellicott's Daughter* (1891), and *The Vengeance of James Vansittart* (1895).

Needle (nē'dl), a small instrument of steel, pointed at one end, and having an eye or hole in it through which is passed a thread, used for sewing. From very ancient times needles of bone,

ivory, wood and bronze have been used. The manufacture of steel needles was first introduced into England in the reign of Elizabeth. The operations that an ordinary sewing needle goes through are very numerous, though of late many improvements have been introduced which reduce the number of separate operations, and many of the needle-making processes are performed by machinery at a great saving of time and labor. The chief of the ordinary operations that a sewing needle goes through in their proper order are such as follows:—The cutting of the steel wire into lengths sufficient for two needles; the pointing of these at both ends on a grindstone by fifty or sixty at a time; the cutting of each length through the middle to give two needles; the flattening of the heads by a blow with a hammer; the piercing of the eyes with a punch applied first on one side, then on the other; the trimming of the eyes; the grooving and rounding of the head; hardening, tempering, straightening; polishing, which is done by making some 500,000 needles into a cigar-shaped bundle along with emery and oil and rolling them backwards and forwards under a weight. Modifications of the ordinary sewing needle are used in the various forms of sewing machines, in sail making, bookbinding, glovemaking, darning, staymaking, etc. The name is also applied to implements of iron or steel, bone, wood, etc., used for interweaving or interlacing a thread or twine in knitting, netting, embroidery, jacquard loom weaving, etc., and formed in various ways, according to the purpose for which they are intended; as also to sundry long and sharp-pointed surgical instruments, some employed for sewing, others for other purposes, as in operations for cataract. The small piece of steel pointed at both ends and balanced on a pivot, as in the compass and some forms of telegraphic instruments, is also called a needle, and the term is used for various other objects.

Needle-gun, a breech-loading rifle the cartridge of which contained a small quantity of detonating powder which was exploded by the rapid darting forward of a needle or small spike. It is now superseded by weapons of superior efficiency. See *Rifle*.

Needle-ore, acicular bismuth glance; native sulphide of bismuth, lead and copper occurring imbedded in quartz in long, thin, steel-gray crystals, marked with vertical striæ, and apparently in four or six-sided prisms. It consists of lead 35.8, copper 11, bismuth 36.7, and sulphur 16.5, and usually accompanies native gold.

Needles, The, a cluster of insulated chalk rocks in the English Channel, off the west extremity of the Isle of Wight. They owe their name to their pyramidal and pointed shape. The Needles Lighthouse, on the most westerly of the group, has an occulting light 80 feet above high-water, visible for 14 miles.

Neef (nāf), or Neefs, Pieter, Flemish painter, born at Antwerp in 1570; died in 1651. He excelled in architectural subjects, the figures in his pictures being frequently by Teniers and other masters.

Neenah (nē'na), a city of Winnebago Co., Wisconsin, on Fox River, 95 miles N. of Milwaukee. It is a railroad center and has large paper-manufacturing plants; also stoves, hardwood products, shoes, textiles, brass and iron castings, flour, etc. Pop. (1920) 7171.

Neer (nār), Aart van der, a Dutch landscape painter, born at Amsterdam in 1613; died in 1683. His chief subjects were canal scenes by moonlight, conflagrations at night, and winter landscapes. His son, Eglon Hendrick, born in 1643, died in 1703, was also an excellent painter, devoting himself chiefly to genre subjects.

Neerwinden (nār'vin-dĕn), a village in the province of Liége, 16 miles from Louvain. It is the scene of the defeat of the allied English, Dutch and Austrian armies by the French in 1693, and the defeat of Dumouriez by the Austrians in 1793.

Ne exeat Regno ('let him not go out of the kingdom'), in English law, a writ prohibiting the person against whom it is directed from leaving the kingdom, as when a person who owes an actually due equitable debt meditates going abroad to avoid payment.

Negapatam (neg-a-pa-tăm'), a town and chief port of Tanjore District, Madras Presidency. It was an early settlement of the Portuguese; was taken by the British in 1781. Pop. (1911) 60,168.

Negaunee (nē-gą'nē), a city of Marquette County, Michigan, 12 miles S. of Marquette. It is in an iron mining district with very large ore deposits and has extensive iron mining interests with mines and blast furnaces within the city limits. Pop. (1920) 7419.

Negligence (neg'li-jens), in law, the omission to do that which ought to be done. When such want of care results in injury to another, or involves a wrong done to society, it renders the party guilty of negligence

liable to either an action for damages or trial for misdemeanor. In law there are recognized three degrees of negligence: *ordinary*, the want of ordinary care or diligence; *slight*, the want of great care or diligence; and *gross*, the want of slight care or diligence. The person charged with negligence must have been under an obligation to exercise care or diligence either assumed by contract or imposed by law. An alleged act of negligence must always be the proximate cause of the injury sustained; but any injury caused to a person by another who at the time is exercising due care is not actionable. The question of negligence is usually one for a jury, and the onus of proof rests on the pursuer, except when the thing resulting from the negligence speaks for itself. A master is responsible for the negligence of his servants, but in no case can redress be had where contributory negligence on the part of the pursuer is proved.

Negrais (nē-gris), a cape at the s. w. extremity of the coast of Bassein, Lower Burmah.

Negritos (ne-grē'tōz), or NEGRILLOS, a name given to several negro-like races inhabiting the islands, etc., of Southeastern Asia, and often confounded with the Papuan race. The chief tribes are the Aëtas, the indigenous people of the Philippine Archipelago, still inhabiting the interior of Luzon and some other islands; the Samangs of Malacca; and the Mincopies inhabiting the Andaman Archipelago. They are dwarfish in stature, averaging from 4 ft. 6 in. to 4 ft. 8 in. in height; the nose small, flattened or turned up at the apex, and the hair soft and frizzled. They resemble in size and in some other particulars the pigmy tribes of Africa. The various tribes speak distinct and mutually unintelligible dialects. A tribe of the same type has recently been found in New Zealand.

Negro (nē'grō), the name of numerous rivers, both large and small. See *Rio Negro*.

Negroes (nē'grōz), a race of the human species indigenous to the Soudan and Guinea, though the term is often extended so as to cover all the tribes inhabiting Africa from the southern margin of the Sahara as far as the territory of the Hottentots and Bushmen, and from the Atlantic to the Indian Ocean. These tribes are all dark-colored, yellow, copper-red, olive, or dark-brown, passing into ebony-black. The typical negro, however, is described as having a black skin, woolly or crisp hair, a protuberant mouth with thick lips, nose thick and flat, thick narrow skull, flat and receding forehead, hair of the face scanty, thorax compressed, flat buttocks, long arms, knees bent outward, calves weak, and feet comparatively flat with long heels. The brain, though essentially similar to that of the white races, is not so large, and the Negro, as a rule, differs as much from the white in mental as in physical characteristics, though there are many individual exceptions. He is very receptive, and in that which requires imitation he is well developed, but in that which requires independent thought he stands on a low plane. He has less nervous sensibility than the white man and can flourish in climates fatal to the higher races, and the race does not diminish in contact with civilization. The slave system has taken great numbers of Negroes from their native country, mostly to America and the West India Islands, where there has been considerable intermixture of races. More than one-third of all persons of African descent are in the United States, and many of them hold good positions in life. Negroes also rise to superior positions in the West Indies and elsewhere.

The description above given of the characteristics of the typical negro, as seen in Africa, does not apply to the colored citizens of the United States. Several centuries of life in a temperate climate, and amid civilized surroundings, in connection with a considerable infusion of white blood, has largely modified their physical aspect and developed their mental capacity, and in view of the fact of their recent release from the unfavorable conditions of slavery, their progress in various respects has been very promising. Except in color they do not appear to differ essentially in racial characteristics from the whites, while their industrial progress has been very encouraging. In 1863 the negro freed men in the United States owned 9000 houses, operated 15,000 farms, and 2000 places of business, and had accumulated $20,900. In 1913 they owned 550,000 houses, operated 937,000 farms and 40,000 places of business, and had accumulated $70,000,000. In this we have a noteworthy object lesson well worth presenting. The colored citizens of the United States of the last census numbered 9,827,763.

Negro Suffrage. The Thirteenth Amendment, adopted December 18, 1865, made slavery in the United States unconstitutional. The Fourteenth and Fifteenth Amendments conferred upon the descendants of the slaves and upon the descendants of the free Negroes, the constitutional rights which had been denied them under the so-called 'Black Laws,' passed by the dif-

ferent states. After the Fifteenth Amendment of the Constitution was ratified, March 30, 1870, California, Colorado, Connecticut, Delaware, Indiana, Kansas, Kentucky, Maryland, Michigan, Nevada, New Jersey, Ohio, Oregon and Pennsylvania still restricted the suffrage to white persons. In order to make the provisions of the Fifteenth Amendment effective Congress, on May 31, 1870, passed an act, the first section of which declares: 'All citizens of the United States who are or shall be otherwise qualified by law to vote at any election by the people in any state, territory, district, county, city, parish, township, school district, municipality, or other territorial division, shall be entitled and allowed to vote at all such elections without distinction, of race, color, or previous condition of servitude, any constitution, law, custom, usage, or regulation in any state, territory, or by or under its authority to the contrary notwithstanding."

Beginning with 1890, the Southern States have by the adoption of constitutional amendments sought to restrict Negro suffrage. Suffrage amendments have been adopted by the Southern States in the following order: Mississippi, 1890; South Carolina, 1895; Louisiana, 1898; North Carolina, 1900; Alabama, 1901; Virginia, 1902; Georgia, 1908; and Oklahoma, 1910. The substance of the laws restricting suffrage is that the prospective voter must have paid his full taxes and then, in order to register, must own a certain amount of property, or must be able to pass an educational test or must come under the 'Grandfather' clause.

Tax Test. Alabama, Arkansas, Florida, Louisiana, North Carolina, South Carolina, and Tennessee require the payment of poll taxes, as a prerequisite to voting. In Georgia all taxes legally required since 1877 must be paid six months before the election.

Property Test. The property requirement in Alabama is forty acres of land in the state or real personal property worth three thousand dollars on which the taxes for the preceding year have been paid. In Georgia it is forty acres of land in the state or five hundred dollars' worth of property in the state. The Louisiana requirement is three hundred dollars' worth of property and payment of personal taxes. South Carolina prescribes three hundred dollars' worth of property on which taxes for the preceding year have been paid. Mississippi, North Carolina and Virginia have no property test.

Educational Test. Alabama requires that the applicant, unless physically disabled, must be able to read and write the Constitution of the United States in English. In Georgia he must, unless physically disabled, be able to read and write the Constitution of the United States in English; or if physically disabled from reading and writing, to 'understand and give a reasonable interpretation' of the Constitution of the United States or of Georgia, when read to him. Louisiana requires that the applicant must be able to read and write and must make an application for registration in his own handwriting. In Mississippi he must be able to understand or reasonably interpret any part of the Constitution of the state. In North Carolina the requirement is the ability to read and write the state Constitution in English. The Constitution of Oklahoma says the applicant must be able to read and write any section of the state Constitution. South Carolina requires ability to read and write the Constitution. Virginia requires that the applicant must make out his application in his own handwriting and prepare and deposit his ballot without aid.

Grandfather Clause. The 'Grandfather' clause permits a person who was not able to satisfy either the educational or property tests to continue a voter for life if he was a voter in 1867 (or in Oklahoma in 1866) or is an old soldier or the lineal descendant of such voter or soldier, provided, except in Oklahoma, that he register prior to a fixed date. The expiration of the date when such persons could register was, in South Carolina, January 1, 1898; Louisiana, September 1, 1898; Alabama, December 20, 1902; Virginia, December 31, 1903; North Carolina, December 1, 1908; Georgia, January 1, 1915. The Oklahoma 'Grandfather' clause was declared invalid in 1915.

Understanding and Character Clauses. Only two states, Georgia and Mississippi, have permanent 'Understanding' and 'Character' clauses. Although in Georgia a person may have neither property nor education he may be permitted to register if he is of good character and understands the duties and obligation of citizenship under a republican form of government. The Mississippi law permits one who cannot read to register if he can understand and reasonably interpret the Constitution when read to him. In Alabama, South Carolina and Virginia the 'Understanding' clause was a part of the 'Grandfather' sections and became inoperative with the 'Grandfather' clause.

Negros (nā'grōs), an island in the Asiatic Archipelago, belonging to the Philippines, lying between Panay and Cebu. Length, 130 miles; area, 4839 sq. miles; pop. 400,776.

Negus (nē'gus), a drink made of port or sherry wine mixed with hot water, sugar, nutmeg and lemon juice; so called from Colonel Negus, the inventor.

Nehemiah (nē-he-mī'â), a distinguished and pious Jew, who was born in captivity, but was made the cup-bearer of Artaxerxes Longimanus, king of Persia. He was sent, B.C. 444, as governor to Jerusalem, with a commission to rebuild the walls and gates of that city. He accomplished his purpose, but not without difficulties, arising partly from the poverty of the lower classes of the people, and partly from opposition of the Ammonites and other foreign settlers. The *Book of Nehemiah* contains Nehemiah's account of his proceedings, with other matter which forms a supplement to the narration contained in the *Book of Ezra*.

Neilgherry Hills (nēl'ge-ri; properly *Nilgiri*, that is 'blue mountain'), a district and range of mountains in Madras Presidency, South Hindustan. The district is bounded by Mysore, Coimbatore and Malabar; area, 957 sq. miles. It consists of a nearly isolated plateau, with an average elevation of over 6000 feet. There are six peaks over 8000 feet in height, the highest being Dodabetta, 8760 feet. The chief town is Utakamand (Ootacamund), which is a valuable sanitarium. The district produces coffee, tea and cinchona.

Neisse (nī'sė), a fortified town, district of Oppeln, Prussian Silesia, on a river of same name, 47 miles S. S. E. of Breslau. It is generally well built, and has some interesting buildings, especially the fine church of St. James, completed in 1440. Its manufactures are unimportant, but it has an active trade. Pop. (1905) 25,394.

Neith (nēth), or NEITHA, an Egyptian goddess who was worshiped especially as a local divinity at Sais, in Lower Egypt. She had some of the characteristics of the Greek Athēnē, or Minerva.

Nejd, or NEDJID (ned'jed; Arab. 'elevated country'), a term sometimes used as an element in Arabic place names, but used absolutely to signify the country in the interior of Arabia forming the central Wahabi kingdom. A great part of its surface is sandy desert interspersed with fertile spots. The more elevated districts feed immense droves of camels and the best breeds of Arab horses. Its chief town is Riad (28,000 inhabitants), the Wahabi capital.

Nejin, NIEJIN, or NYESHIN, a town in Russia, in the government of Czernigov, on the left bank of the Oster, about 80 miles N. E. of Kiev. Pop. 43,030.

Nelaton (nā-lâ-tōn), AUGUSTE, a noted French physician and surgeon, born in 1807; died in 1873. He studied medicine at Paris, and graduated as doctor in 1836. Soon after he was appointed hospital surgeon and private lecturer in the faculty of medicine in the University of Paris. From 1851 to 1867 he was professor of clinical medicine. In 1866 he was appointed surgeon to Napoleon III, and was created a senator by imperial decree in 1868. He was specially renowned for his skill in operating for the removal of calculus, and was the inventor of a new method of operating in this disease. He published several works on surgery.

Nellore (nel-lor'), a town in India, in the Presidency of Madras, capital of district of the same name. It is a tolerably clean and airy town, and has railway and canal communication with other parts of the country. Pop. 32,040. The district lies on the Coromandel coast; area, 8739 sq. miles. It is famous for its breed of cattle.

Nelson (nel'sun), a town and provincial district in New Zealand, in the northwest of South Island. The town, which is a seaport, is situated on a small harbor at the bottom of Blind Bay, in the county of Waimea. It has a cathedral and churches of various denominations, a literary institute and museum, theater, and numerous fine public and business buildings. Leather making, brewing, fruit-preserving, etc., are among the industries. Steamers ply regularly to all the neighboring ports. Pop. 8164. The district has an area of 10,468 sq. miles. Although agriculture is now carried on to a considerable extent, still the great wealth of the district lies in its minerals. Unlimited beds of excellent iron ore, lead and copper ores, coal and gold, both alluvial and quartz, are all wrought to a considerable extent.

Nelson, or NELSON IN MARSDEN, a town in N. E. Lancashire, England, 3½ miles N. E. of Burnley. There are various manufactories, and coal is worked in the neighborhood. Pop. (1911) 39,485.

Nelson, HORATIO, VISCOUNT, a celebrated British admiral, was born in 1758, at Burnham Thorpe, in Norfolk (where his father was rector); died in 1805. At the age of twelve he entered the navy as a midshipman, and in 1773 accompanied Commodore Phipps in an ex-

pedition towards the north pole. In 1777 he was made a lieutenant, and in 1779 raised to the rank of post-captain. He distinguished himself in an attack on Fort Juan, in the Gulf of Mexico, and on other occasions, and remained on the American station till the conclusion of peace. He afterwards commanded the *Boreas* frigate, and was employed to protect the trade of the Leeward Islands. On the commencement of the war with the French Republic he was made commander of the *Agamemnon*, of sixty-four guns (1793), with which he joined Lord Hood in the Mediterranean, and assisted at the siege of Bastia (May, 1794). At the siege of Calvi (July 10, 1794) he lost an eye. For his gallantry at the battle of Cape St. Vincent (Feb. 14, 1797) he was made rear-admiral of the blue, and appointed to the command of the inner squadron at the blockade of Cadiz. His next service was an attack on the town of Santa Cruz, in the Island of Teneriffe, in which he lost his right arm. In 1798 he joined Lord St. Vincent (Admiral Jervis), who sent him to the Mediterranean to watch the progress of the armament at Toulon. Notwithstanding his vigilance, the French fleet which conveyed Bonaparte to Egypt escaped. Thither Nelson followed, and after various disappointments he discovered the enemy's fleet moored in the Bay of Aboukir, where he obtained a most complete victory, all the French ships but two being taken or destroyed (August 1, 1798). This achievement was rewarded with the title of *Baron Nelson of the Nile* and a pension of £2000. His next service was the restoration of the King of Naples, which was accompanied with circumstances of revolting cruelty, generally attributed to the influence of Lady Hamilton (which see), the wife of the English ambassador. In 1801 he was employed on the expedition to Copenhagen under Sir Hyde Parker, in which he effected the destruction of the Danish ships and batteries. On his return home he was created viscount. When hostilities recommenced after the Peace of Amiens Lord Nelson was appointed to command the fleet in the Mediterranean, and for nearly two years he was engaged in the blockade of Toulon. In spite of his vigilance the French fleet got out of port (March 30, 1805), and being joined by a Spanish squadron from Cadiz, sailed to the West Indies. The British admiral hastily pursued them, and they returned to Europe and took shelter at Cadiz. On the 19th of October the French, commanded by Villeneuve, and the Spaniards by Gravina, ventured again from Cadiz, and on the 21st they came up with the British squadron off Cape Trafalgar. An engagement took place, in which the victory was obtained by the British, but their commander was wounded in the back by a musket-ball, and shortly after expired. His remains were carried to England and interred in St. Paul's Cathedral. Monuments to his memory have been erected in various cities.

Admiral Lord Nelson.

Nelson, KNUTE, statesman, born in Norway in 1843, came to the United States in 1849. He took part in the Civil war, became a lawyer, was elected to the Wisconsin and Minnesota legislatures, and was a member of Congress 1883-89. He was governor of Minnesota 1892-95 and was elected to the United States Senate in 1895. He is still a member, ranking among the Progressives.

Nelson River, a river of Canada, which issues from Lake Winnipeg, and after a tortuous course of about 350 miles, during which it passes through a series of lakes, falls into Hudson Bay. It is navigable for small steamers for about 80 miles.

Nelsonville (nel'son-vil), a village of Athens County, Ohio, on the Hocking River, 14 miles N. W. of Athens. The mining of coal is its principal business. It has a foundry and machine shops, brick and clay works, and several mills. Pop. (1920) 6440.

Nelumbium (ne-lum'bi-um), a genus of aquatic plants inhabiting the fresh waters of the temperate parts of the world, type of the nat. order Nelumbiaceæ, having large polypetalous flowers with numerous stamens. The best-known species is *Nelumbium speci-*

ōsum, the Hindu and Chinese lotus, a magnificent water-plant of the rivers and ditches of all the warmer parts of Asia, the Malay Archipelago, Australia, and also found in the Nile (formerly at least). The numerous canals of China are filled with it, its tubers being there used as a culinary vegetable. It is a most beautiful plant, with peltate leaves and handsome rose-colored flowers on tall stalks, and is frequently cultivated in hothouses. In Asia it is generally deemed sacred, and figures in

Ripe receptacle of *N. speciosum*.

Nelumbium speciosum (Lotus).

religious rites. *N. luteum*, the yellow water-bean of the southern United States, has starchy rhizomes, with tubers like those of the sweet potato, which are used for food.

Nemathelminthes (nem-a-thel-min'-thez), the division of Scolecida that includes those parasitic worms which possess bodies of rounded or cylindrical shape. Among the most familiar are the *Gordiacēa*, or 'hair-worms.' These possess slender hair-like bodies, and are found as parasites in the interior of beetles and other insects during the first stages in their development. On arriving at sexual maturity they escape from the bodies of their hosts and seek the water of pools, in which the eggs are deposited in the form of lengthened chains. The embryos produced from these ova are provided with a retractile proboscis and hooks, by means of which they penetrate the bodies of insects, and there develop into the sexually mature worms. Superstition formerly credited horsehairs, introduced into water, with the property of being transformed into these living creatures. Another order of the Nemathelmia is that of the *Nematōda*, which includes several familiar forms, as the *Ascāris*, or common 'round-worm,' of the human intestines; the *Trichina*, famous for its fatal effects in man; the *Filaria*, or 'Guinea-worm.' The Nematoda, although mostly parasitic, also comprise many free and non-parasitic forms.

Nematocyst (nem-at'o-sist), in physiology, a 'thread-cell' of the Cœlenterata, that is, a cell or minute sac, in the interior of which is a long filament, often serrated or provided with spines, and capable of being swiftly protruded. It is to their nematocysts that the power of stinging possessed by many of the Cœlenterata is due.

Nemato'da. See *Nematelmia*.

Nemean Games, (ne-mē'an), Greek games, held in the valley of Nemea in Argolis, where Hercules is said to have killed the Nemean lion. They recurred ordinarily every second year, and were similar in character to the other Greek games. (See *Games*.) Eleven of Pindar's odes are in celebration of victors at the Nemean games.

Nemertida (nem-er'ti-da), a group of the Scolecida (Annuloida), represented by the 'ribbon-worms' found on the sea-coasts of various countries. They possess flat, ribbon-like bodies, which, as in the *Borlasia* of the British coasts, may attain a length of more than 15 feet. Some of the species of the type-genus *Nemertes* attain a length, in their extended state, of 30 or 40 feet, which they can suddenly contract to the length of 3 or 4 feet.

Nemesis (nem'e-sis), a female Greek divinity who appears to have been regarded as a personification of the righteous anger of the gods, inflexibly severe to the proud and insolent, *i.e.*, retributive justice. In the theogony of Hesiod she is the daughter of Night, the avenging Fate who checks and punishes the favorites of Fortune.

Nemi (nā'mē), a lake in Italy, about 17 miles south of Rome. It is evidently the crater of an extinct volcano; has a circuit of 5 miles, and discharges its waters through an ancient tunnel. A village of the same name lies on the N. E. shore.

Nemours (né-mör), a French town in the department of Seine-et-Marne, 10 miles south of Fontainebleau, of some historical importance. Pop. (1906) 4814.

Nen, an English river, rises in the N. W. of Northamptonshire, and falls into the Wash after a course of 70 miles.

Nenagh (nen'ä), a town in Ireland, county of Tipperary, 28 miles northeast of Limerick. It has the remains of an old castle, and does a good general trade. Pop. about 4700.

Nennius (nen'ni-us), the supposed author of a collection of chronicles and genealogies styled *Historia Britonium*, written in Latin, and reaching down to A.D. 655. The author is supposed to have been a monk at Bangor in Wales. The authorship as well as the authenticity of Nennius have been much disputed.

Neocomian (nē-ō-kō'mi-an), in geology, a term applied to the lower greensand and Wealden.

Neo-Darwinism, the Darwinian theory as held by many more recent scientists. A number of difficulties have arisen in the study of the theory of natural selection, and several hypotheses have been advanced in their explanations, so that, though the theory is still strongly maintained, it has been modified in important details by the Neo-Darwinists.

Neogene (nē'ō-jēn), in geology, a name given by some geologists to the Pliocene and Miocene tertiaries to distinguish them from the older Eocene strata.

Neo-Lamarckism, the views at present entertained, especially by American scientists, concerning the Lamarckism theory of evolution. This maintains that change in species is largely due to 'use and effort,' the continued attempts of animals to take the best advantage of surrounding conditions having led to gradual changes of structure fitting them to external circumstances. Many modern scientists hold a modified view of this doctrine.

Neolithic (nē-ō-lith'ick), in archæology, a term applied to the more recent of the two periods into which the stone age has been subdivided, as opposed to *palæolithic*. During this period there is found no trace of the knowledge of any metal excepting gold, which it would seem had sometimes been used for ornaments. The Neolithic stone implements are finely shaped and polished, as contrasted with the roughly wrought palæolithic stones, and are found in connection with the remains of extinct animals.

Neomorpha. See *Huia-bird.*

Neon (nē'on), a recently discovered gaseous chemical element existing in the air. It was found by Ramsay and Collie, English physicists, in 1898, who separated it from argon while experimenting with liquid air. Its chemical number is 14.67, and it has the inertness of argon.

Neophron (nē'ō-fron), a genus of birds of the vulture family, one species of which (*N. percnoptérus*) inhabits Southern Europe, Egypt and Asia. It is known as the Alpine or Egyptian vulture, Pharaoh's chicken, etc.

Neo-platonism. See *New Platonists.*

Neotropical (nē-ō-trop'i-kal), a term applied to one of the six regions into which zoologists divide the surface of the earth, based on their characteristic fauna or collection of animal life. The Neotropical region includes Central America south of the Isthmus of Tehuantepec and South America.

Neottia (nē-ot'sha), a small genus of Orchidaceæ, readily distinguished by its habit, all the species being leafless brown-stemmed plants, with sheathing scales in place of leaves.

Neozoic (nē-u-zō'ik; Gr. *neos*, new, *zōē*, life), in geology, a name under which Prof. E. Forbes proposed to include all the strata from the beginning of the Trias up to the most recent deposits; the *Mesozoic* and *Cainozoic* of other palæontologists. Forbes suggested this classification on the ground that while there is a widely-marked distinction between Palæozoic and Mesozoic fossils, there is no essential difference between Mesozoic and Cainozoic.

Nepa (nē'pa), a genus of hemipterous insects, popularly known by the name of 'water-scorpions.'

Nepal (ne-pal'), NIPAL', or NEPAUL', a small independent state situated on the N. E. frontier of Hindustan, on the southwest slope of the highest part of the Himálaya range, between lat. 26° 25′ and 30° 17′ N., and lon. 80° 61′ and 88° 14′ E.; area, about 54,000 square miles. The country is a table-land from 3000 to 6000 feet above the level of the sea. It contains within its boundaries the highest mountains in the world—Mount Everest, Dhawalagiri, and on its eastern borders Kanchinjinga. From the mountains southwards, the land gradually descends, forming four distinct terraces, differing in climate and vegetation. The climate is on the whole temperate except in the most elevated districts in the north, where it is very cold. The most important rivers are the Ghogra or Kanar, the Gandak and the Kusi, all of which rise in Tibet on the north beyond the Himálayas. Magnificent forests of sal, sisoo, and toon trees stretch along the declivities of the lower hills into the adjacent plains. The forests higher up exhibit a greater variety, gradually as-

suming more and more of an Alpine character. The principal products are rice, wheat, hemp, cotton, tobacco and madwheat, hemp, cotton, tobacco, and madder. Pasturage is on the whole scarce and indifferent. The sheep and goats, however, have fine wool. Horses are imported from Tibet. The wild animals are elephants, black bears of great size, hogs, hog-deer, foxes, jackals and a few tigers. The manufactures of Nepal are confined chiefly to coarse cotton cloth. The trade is chiefly carried on with British India and Tibet. The inhabitants are descended from successive tides of invaders, the Goorkhas (which see) and Newars predominating. The government is despotic, the Maharaja being the nominal ruler only, as the supreme power is in the hands of the prime minister. A British resident is stationed at Khatmandu, the capital. Pop. estimated by the natives to be about 5,200,000.

Nepenthe (ne-pen'the), a drug which was fabled by the ancient poets to banish the remembrance of grief and to cheer the soul. It is thought by many to have been opium.

Nepenthes. See *Pitcher-plant.*

Nepeta (nep'e-ta), a genus of labiate plants, of which the catmint is a typical species.

Nephelin (nef'e-lin), or NEPH'ELITE, a mineral found mixed with other substances, in plutonic or volcanic rocks, in small masses or veins, and in hexahedral crystals. It is usually white or yellow.

Nephe'lium. See *Litchi, Longan.*

Nephrite (nef'rīt), a mineral, an aluminous variety of amphibole among the bisilicates, of a leek-green color, massive, and in rolled pieces, remarkable for its hardness and tenacity. It was formerly worn as a remedy for diseases of the kidneys. A unisilicate, zoisite, is also spoken of as nephrite, as is jade. All three are capable of fine polish, and have been used since prehistoric times for ornaments, weapon-handles, and even weapons.

Nephthys (nef'this), an Egyptian deity, the wife of Seth. Her proper sphere was the nether world, though she occurs in the upper world as the instructress of Horus. She is associated as one of a tetrad with Osiris, Isis and Horus. She was called by the Greek writers *Teleutē* (End), *Aphroditē* and *Nikē* (Victory).

Nepomuk (nā'po-mŏk), JOHANN VON, the patron saint of Bohemia. He was born at Pomuk in Bohemia about 1330; was martyred in 1393. In 1378 he became court preacher to King Wenceslaus (Wenzel), but incurring the displeasure of that monarch he was cruelly tortured and thrown from the bridge over the Moldau into the river (1393). In the course of the fifteenth, sixteenth and seventeenth centuries many legends gathered round his name, and in 1729 Benedict XIII canonized him. The day consecrated to his memory is the 16th of May.

Nepos. See *Cornelius Nepos.*

Neptune (nep'tūn), the chief marine divinity of the ancient Romans. When the Greek mythology was introduced into Rome he was completely identified with the Greek Poseidōn, all the traditions relating to whom were transferred by the Romans to their own deity. In art he is usually represented as armed with a trident, and the horse and the dolphin are his symbols. See *Poseidōn.*

Neptune, in astronomy, the most distant of the known planets, its mean distance from the sun being 2,791,600,000 miles. The eccentricity of its orbit is .00872; its inclination to the plane of the ecliptic is 1° 47′. Its apparent diameter is about 2.7″. Its real diameter is estimated at 34,800 miles, and it seems to have very little polar compression. Its mass is about 16¾ times that of the earth, and it revolves round the sun in 164.6 years. It has one satellite, whose period is 5 days 21 h. 2 m. 44s., and whose mean distance from the planet is 230,000 miles. Neptune was discovered in 1846 in a position indicated independently by Leverrier and Adams, and deduced from a series of recondite mathematical calculations to find a body which could account for the long-observed perturbations of Uranus.

Neptunian Theory, a name given to a geological theory of Werner's, which referred the formation of all rocks and strata to the agency of water; opposed to the *plutonic, igneous,* or *Huttonian theory.*

Nérac (nā-rak), a town of France, department of Lot-et-Garonne, 16 miles W. S. W. of Agen, on the banks of the Baise. Here Henry IV held his court when King of Navarre, and Calvin and other reformers found an asylum with Queen Margaret. Pop. 4055.

Nerbudda, or NARBADA (nar-ba'dā), a river of Hindustan, which rises on the northwest confines of the ancient territorial division of Gondwana, in the Central Provinces, flows first west and northwest across a plateau, then west, inclining gently to the south,

forming part of the boundary between the Central Provinces and Indor, and falls into the Gulf of Cambay after a course of about 800 miles. In religious sanctity it ranks second only to the Ganges. Nerbudda is also the name of a division of the Central Provinces of India; area, 17,513 sq. miles.

Nerchinsk (nyer'chinsk), a Siberian mining town, province of Transbaikal, 540 miles E. of Irkutsk. The neighborhood yields gold, silver, lead, iron and tin, and a considerable fur trade is carried on. Pop. 6713.

Nereidæ (ne-rē'i-dē), NE'REIDS, the sea-centipedes, of which the genus *Nereis* is the type.

Nereïds (nē're-idz), in classical mythology, sea nymphs, daughters of Nereus and Doris, and constant attendants on Poseidon or Neptune. They are represented as riding on sea-horses, sometimes with the human form entire, and sometimes with the tail of a fish. They were distinguished on the one hand from the Naiads or the nymphs of fresh water, and on the other hand from the Oceanides or nymphs of the ocean.

Nereïs (nē're-is), a genus of dorsibranchiate annelids, consisting of worm-like animals with long segmented bodies, antennæ or feelers, eyes when distinct four in number; mouth usually with horny jaws. Some of the species are found in most seas. One species, *N. prolifĕra*, propagates by spontaneous division, the hind part of the body being gradually transformed into an additional animal.

Nereocystis (nē-re-ō-sis'tis), a seaweed of the nat. order Laminariaceæ, found on the northwestern shores of America and opposite shores of Asia, remarkable for the stems, which attain the length of 45 fathoms, swelling at the top into large cysts or bags filled with liquid; these becoming entangled form large floating islands on which sea-otters rest.

Nereus (nē'rūs), in classical mythology, an inferior divinity of the sea, the progenitor of the Nereids, a god subordinate to Poseidon (Neptune). In the ancient works of art, and also by the ancient poets, he is represented as an old man, with a wreath of sedge, sitting upon the waves with a scepter in his hand.

Nergal (ner'gal), the god of war among the ancient Babylonians.

Neri (nā'rē), ST. FILIPPO DE', the founder of the Congregation of the Oratory in Italy, was born in Florence in 1515, of a noble family; died in 1595. He early devoted himself to the study of theology and the canon law; established hospitals for the relief of pilgrims and the destitute sick, and founded the order of 'Priests of the Oratory,' which was approved by Gregory XIII in 1595. He was canonized in 1622.

Neriad (ner-i-ad'), a town of India, Kaira district, Presidency of Bombay, and a station on the Bombay, Baroda and Central India Railway, 35 miles N. W. of Baroda. It is the center of an extensive tobacco trade. Pop. 28,304.

Nerium. See *Oleander*.

Nero (nē'rō), LUCIUS DOMITIUS AHENOBARBUS (after his adoption by the Emperor Claudius called *Nero Claudius Cæsar Drusus Germanicus*), Roman emperor, the son of Cneius Domitius Ahenobarbus and Agrippina, the daughter of Germanicus. He was born in 37 at Antium, and after the marriage of his mother, in third nuptials, with her uncle, the Emperor Claudius, was adopted by that prince, and married to his daughter Octavia. When Nero was about seventeen years of age his abandoned mother poisoned her husband, Claudius, and succeeded in raising her son to the throne, over whom she expected to exercise the

Nero.

most absolute control. Nero became Emperor in 54, and the year following disposed of the rightful heir, Britannicus, by poison. For the first few years his public conduct, under the control of Burrhus and Seneca, was unexceptionable; in private, however, he disgraced himself by the most odious vices, and his mother endeavored to retain her influence by shamefully complying with his inclinations. In 59 Nero caused this detestable woman to be murdered, and then, fearing no rival in power, gave full scope to the darkest traits of his character. In 62 he repudiated his wife Octavia. In 64

the burning of Rome occurred, which has been charged, not without probability, upon Nero himself, who, however, accused the Christians of the act, and made it the occasion of the most dreadful cruelties towards them. His debaucheries and cruelties occasioned an almost general conspiracy against him, known as that of Piso, in 65, the discovery of which led to more tortures and bloodshed. The revolt of Vindex was also suppressed. That of Galba in 68 succeeded, and Nero escaped arrest by stabbing himself, being then in the thirty-first year of his age and the fourteenth of his reign. He was a lover of arts and letters, and possessed much taste as a poet and histrionic performer.

Nerthus (nêr'thus), an ancient German goddess, regarded as representing the earth.

Nerva—Antique Gem.

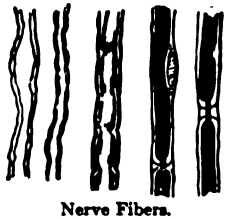
Nerva (nêr'va), the successor of Domitian, and one of the most virtuous of the Roman emperors. He was born in Umbria in 32 A.D.; died A.D. 98. He was twice consul, and was elected emperor on the death of Domitian in 96. He adopted Trajan, who succeeded him.

Nerve (nêrv), NERVOUS SYSTEM. A nerve is one of the fibers which proceed from the brain and spinal cord, or from the central ganglia of lower animals, and ramify through all parts of the body and whose function is to convey impulses resulting in sensation, motion, secretion, etc. The aggregate of these nerves, and the centers from which they proceed, forms the nervous system, the medium through which every act or detail of animal life is inaugurated and directed. The essential idea of any nervous system involves the necessary presence, firstly, of a *nerve center* or *centers*, which generate the nervous force or impulse; secondly, of conducting fibers or cords, the *nerves;* and thirdly, of an *organ, part,* or *structure* to which the impulse or impression may be conveyed. The nerve centers of man and vertebrates generally are disposed so as to form two chief sets, which are to be regarded as essentially distinct. The brain and spinal marrow together (see *Brain*) constitute the first of these centers, and are collectively included under the name *cerebro-spinal system* or *axis.* The second system is the *sympathetic* or *ganglionic.* From each of these systems nerve cords are given off—the *cerebral* and *spinal* nerves from the former; and the so-called *sympathetic* fibers from the latter. The brain and spinal cord are contained within the continuous bony case and canal formed by the skull and spinal column; while the chief masses of the sympathetic system form an irregularly disposed chain, lying in front of the spine, and contained within the cavities of the thorax or chest and abdomen. The general functions of the cerebro-spinal system are those concerned with volition and muscular movements, with the control of the senses, and in higher forms with the operations of the mind. The nerves of the sympathetic system in chief are distributed to the viscera, such as the heart, stomach, intestines, blood-vessels, etc.; and the operation of this system is in greater part of the involuntary kind, and without the influence or command of the will. The cranial or cerebral nerves pass from the brain through different openings in the skull, and are all in pairs, the first pair being the *olfactory* nerves or nerves of smell; the second, the *optic* nerves, or nerves of sight; while others have to do with hearing, taste, general sensibility, and muscular motion. The spinal nerves, after issuing from their openings in the vertebral column, split into two divisions, one of which proceeds to supply parts behind the spine, while the other passes towards the front. The first eight spinal nerves on each side are called *cervical,* the next twelve are *dorsal,* the next five *lumbar,* then five *sacral,* and one *coccygeal.*

All nervous structures consist of two elements, *nerve cells* and *nerve fibers.* The cells and fibers are combined and associated in various ways, and are imbedded in and supported by fine connective tissue so as to form a connected structure. The cells vary in size from $\frac{1}{5000}$ to $\frac{1}{100}$ of an inch, and consist of masses of protoplasm containing a nucleus and nucleolus. Processes or poles pass from the cell, branching outward. Nerve fibers are of a glossy transparency and of a tubular form. They consist of a rod passing down the center, called the axis-cylinder, which is surrounded on all sides by a white substance, the whole being inclosed in a delicate sheath (*neurilemma*). The axis-cylinder is a continuation of the nerve cell process, and acts in an analogous manner to an electric conductor. The nerve fibers may exhibit a diameter so great as the $\frac{1}{1500}$th of an inch; but their average breadth may be stated to vary from $\frac{1}{5000}$th to the $\frac{1}{5000}$th

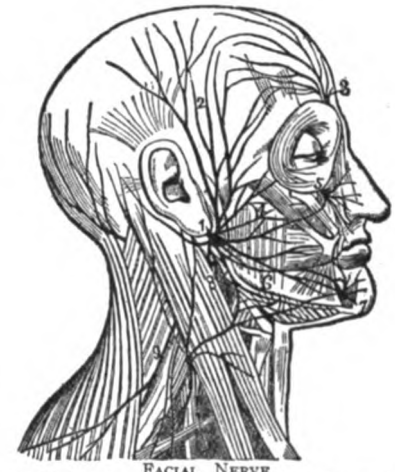
of an inch. The largest fibers are those of the nerve trunks themselves; and they diminish in size in the neighborhood of the nerve centers—brain and spinal marrow—and as they approach to the periphery of the body or to their ultimate terminations. The nerve fibers of the brain and spinal marrow do not exhibit a limiting membrane; and in the gray matter of the brain and cord the fibers are of exceedingly small size, not exceeding the $\frac{1}{10000}$th or $\frac{1}{14000}$th of an inch in diameter.

The general functions of nerve fibers may be briefly considered under two aspects. The fibers may convey impressions *from* the brain or nerve centers *to* their peripheral extremities, or to the parts to which they are distributed. Or secondly, they may transmit impressions *from* the periphery, or from the parts they supply, *to* their centers. A double series of nerve fibers, each set subserving one or other of the preceding functions, exists in the cerebro-spinal as well as in the sympathetic nervous system. These series are therefore known as *sensory*, *efferent*, or *centripetal* nerves, when they transmit impressions from their peripheral extremities to the brain or centers; and as *motor*, *efferent*, or *centrifugal* nerves, when they carry impressions from the centers to their peripheral terminations. *Stimuli* of various kinds applied to the nerves arouse the so-called *excitability* of the fibers, and through this property nerves convey impressions thus made upon them. Impressions have been calculated to pass along a nerve at the rate of about 200 feet per second. Nerve fibers in any case —motor or sensory—can carry one kind of impulse only, corresponding to the kind of fiber. In certain nerves the impulses or impressions are of a limited or specialized kind, as in the nerves of special sense—for example, sight, hearing, smell—whereby certain distinct sensations, of light, sound, or odors, are produced. And such nerves, therefore, respond only to stimuli of a special kind. The various nerve centers of the body which originate, or at any rate direct and dispose, the nerve force, may be viewed as simply ganglia, or as collections of ganglia, or nervous masses. The



Nerve Fibers.

brain itself falls under this latter division. The general functional relations existing between the nerve centers and the nerves may be simply illustrated by the phenomena comprehended under the name of *reflex action*. When a peripheral nerve fiber is irritated a sensory or centripetal impression is conveyed towards the nerve center. Arriving at the center the impression is converted into a motor or centrifugal one, and travels along the motor nerve fibers, to excite, it may be, a muscle or other part to action. The general functional relation of the nervous system may be summarized by stating that its functions comprehend the reception and distribution of impressions; that these impressions originate either from influences acting on the periphery, or from the nerve centers, brain, or mind; that these impressions respectively influence or stimulate the mind or nerve centers, and the muscles or secreting structures; and lastly, that all nervous phenomena are exerted through, or accompanied by, nervous action, and that this latter is, so far as physiology has yet been able to determine, of a uniform and similar kind. See also *Eye*, *Ear*, *Nose*, etc.

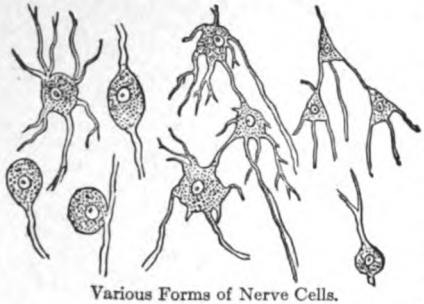


FACIAL NERVE

(1) The facial nerve at its emergence from stylo-mastoid foramen; (2) temporal branches communicating with (3) the frontal branches of the fifth or trifacial nerve; (4) infra-orbital branches communicating with (5) the infra-orbital branches of the fifth nerve; (6) maxillary branches communicating with (7) the mental branch of the fifth nerve; (8) cervico-facial branches; (9) the spinal accessory nerve giving off a branch to the trapezius muscles.

The Invertebrata possess no such specialization of the nervous centers as is

seen in Vertebrates, in which the brain and spinal cord are inclosed within their bony case and canal, and thus shut off from the general cavity of the body. The great and distinctive feature between the nervous system of Vertebrata and that of



Various Forms of Nerve Cells.

lower forms consists in the partial or complete absence of a defined or chief nervous center, through which consciousness may intervene to render the being intelligent, and aware of the nature of the acts it performs.

Nervii (nêr'vi-ī), an ancient people of Gallia Belgica, famous for the stand they made against Cæsar's advance in B.C. 57 and 54. They submitted to the Romans in B.C. 53. Their territory was coextensive with the old diocese of Cambrai.

Nervous Diseases (nêr'vus diz-ē'-zuz), are diseases due either to actual changes in the structure of nerve fibers or nerve centers, or to some irregularity of nerve function without actual structural change. Thus nervous diseases may be due to inflammation or degeneration of nerve substance; to the pressure on some part of the nervous system of tumors, effused blood, or other fluid; to the death of some part by the cutting off of its blood supply, etc.; or may be the result of lowered nervous action as a part of general bad health.

Nervous System. See *Nerve.*

Nervures (nêr'vūrz), in entomology, the corneous tubes which form prolongations of the tracheæ or air-vessels of insects, and which help to expand the wing and keep it tense. The term is applied in botany to the veins or nerves of a leaf.

Ness, a cape or headland; in Britain a frequent element in the names of points of land projecting into the sea. It is of Norse origin.

Ness, LOCH, a lake of Scotland, in Inverness-shire, on the line of the Caledonian Canal. It is long and narrow, stretching S. S. W. and N. N. E. about 22 miles, with a breadth varying from 1½ to 2 miles. Except at the extremities, where it shallows, its depth is from 100 to 130 fathoms. The outlet of the lake is by the river Ness into the Moray Frith.

Nest, the abode or habitation, varying greatly in form, materials and situation, constructed by birds, chiefly for the purposes of incubation and the rearing of the young. The nests of birds are of the most diverse character, some birds making little or no nest, while others construct receptacles for the eggs requiring a great amount of skill and industry. The materials used are also extremely various, being such as mud or clay, twigs or branches, leaves, grass, moss, wool, feathers, etc. Some birds, for the sake of protection, excavate burrows in banks or sandy cliffs in which to make their nests. Many mammals also are nest-builders, notably mice, moles, dormice, squirrels, foxes, weasels, badgers, rabbits, etc.; and nests are also constructed by certain fishes, reptiles, crustaceans, insects, etc. See *Birds' Nests, Edible.*

Nestor (nes'tur), one of the Greek heroes at Troy, son of Neleus, King of Pylos. He took part in the hunting of the Calydonian boar, and in the Argonautic expedition. He is noted as the wisest adviser of the chiefs before Troy, after the fall of which he retired to Pylos, where he lived to a great age.

Nestor, a Russian historian, born about 1056, was a monk at Kiev, and died after 1116. He wrote a chronicle in his vernacular tongue, which has been the foundation of Slavonic history.

Nestorians (nes-tō'ri-anz), a Christian sect of Western Asia, named from their founder Nestorius (see next article), formerly of greater importance than they are at present. One portion of them are united with the Roman Catholic Church though using the Greek ritual. They are commonly known as Chaldæan Christians, and have a patriarch, residing at Diarbekir. The larger body of them remain as a distinct sect, in Mesopotamia, Syria, Persia, etc. They recognize only three sacraments, baptism, the Lord's supper, and ordination; and their priests are allowed to marry. There is a Nestorian body in India called Christians of St. Thomas.

Nestorius (nes-tō'ri-us), heresiarch, was presbyter at Antioch

NETHERLANDS AND BELGIUM
SCALE OF MILES
0 10 20 30 40 50
Railroads,
Canals,
Size of type indicates relative importance of places.
NETHERLANDS
PROVINCES
1 Drenthe.....J 2
2 Friesland...G 1
3 Gelderland.H 3
4 Groningen..J 1
5 Limburg....G 5
6 N. Brabant.F 4
7 N. Holland..E 3
8 Overyssel...J 3
9 S. Holland..E 4
10 Utrecht.....F 3
11 Zeeland.....C 5
BELGIUM
PROVINCES
1 Antwerp....E 5
2 Brabant.....E 6
3 E. Flanders.C 6
4 Hainaut....C 6
5 Liege.....G 6
6 Limburg....F 5
7 Luxemburg F 8
8 Namur.....E 7
9 W. Flanders B 6
NORTH SEA
ZUIDER ZEE
AMSTERDAM
HAGUE
ROTTERDAM
ANTWERP
BRUSSELS
LUXEMBURG
C.S. HAMMOND & CO. N.Y.

and bishop of Constantinople from A.D. 428 to 431. He incurred the charge of heresy by maintaining that in the person of Christ the two natures were not so united as to form but one person. Cyril of Alexandria, at the council of Ephesus in 431, procured the condemnation of the doctrine taught by Nestorius and the deposition of the patriarch. He was banished to the deserts of Egypt, where he suffered much and died (440). Numerous extracts from several of his works, entire epistles, and some sermons are extant. His followers, called Nestorians, were persecuted by several Greek emperors in succession.

Net, a term applied to that which remains of a weight, quantity, etc., after making certain deductions. Thus *net weight* is the weight of merchandise after allowance has been made for casks, bags, or any inclosing material.

Net, an open fabric made of thread, twine, or cord, woven into meshes of fixed dimensions, firmly knotted at the intersections. Nets are used for a great variety of purposes, as for protecting fruit trees, for collecting insects, for hammocks, screens, etc., but chiefly for hunting and fishing. The chief kinds of nets used in fishing are the trawl, the drift, the seine, the kettle or weir, and the trammel or set nets. The trawl is a triangular bag with an arrangement for keeping its mouth open, drawn along the bottom of the water. The drift and seine nets are very long in proportion to their breadth, and differ from one another only in the manner in which they are employed. The seine has a line of corks along one of its long borders, and a line of leaden weights along the other, so that when thrown into the water it assumes a perpendicular position. It is used near the shore, being dragged to land with any fish it may inclose, by ropes fastened to the ends. The drift-net is not loaded with lead, but floats in the water, and is used especially in herring fishing, the fishes as they drive against it becoming caught by the gills. Kettle and weir nets are structures fixed on stakes placed among the coast between high and low water. Trammel or set nets are also fixed between stays, but act like drift-nets. Formerly all nets were made by hand, but since 1820, when James Paterson established a machine-net factory at Musselburgh, hand-made nets have been superseded. Wire nets are used for garden purposes, for hen coops, etc.

Netherlands (neth'ér-landz), THE, or HOLLAND, in Dutch NEDERLAND, or KONINKRIJK DER NEDERLANDEN, a kingdom of Europe which lies on the North Sea, N. of Belgium and W. of part of Northern Germany. Its area is 12,648 square miles; its population is 5,898,429. The country is divided into eleven provinces: North Brabant, Gelderland, South Holland, North Holland, Zeeland, Utrecht, Friesland, Overijssel, Groningen, Drenthe and Limburg. The king is also sovereign (grand-duke) of the Grand-duchy of Luxemburg. In addition to her European territories Holland possesses extensive colonies and dependencies in the Asiatic archipelago and America; including Java, Sumatra, great part of Borneo, Celebes, part of New Guinea, Surinam or Dutch Guiana, the West Indian islands of Curaçao, Saba, St. Eustatius, etc. Estimated colonial pop. 41,347,182.

General Features.—The Netherlands (or Low Countries, as the name implies, formerly including Holland and Belgium) form the most characteristic portion of the great plain of northern and western Europe. It is the lowest part of this immense level, some portions of it being 16 to 20 feet below the surface of the sea, and nearly all parts too low for natural drainage. The coast line is very irregular, being marked by the great inlet of the Zuider Zee, as well as by various others, and fringed by numerous islands. In great part the coast is so low that were it not for massive sea-dykes large areas would be inundated and lost to the inhabitants. In the interior also dykes are a common feature, being built to protect portions of land from the lakes or rivers, or to enable swampy pieces of land to be reclaimed by draining, the water being commonly pumped up by wind-mills. These inclosed lands are called *polders*, and by the formation of the polders the available area of the country is being constantly increased, lakes and marshes being converted into fertile fields, and considerable areas being even rescued from the sea. One of these reclamations was the Lake of Haarlem, the drainage of which, yielding more than 40,000 acres of good land now inhabited by some 12,000 persons, begun in 1839, was finished in 1852. Almost the only heights are the sand hills, about 100 to 180 feet high, forming a broad sterile band along the coast of South and North Holland; and a chain of low hills, of similar origin perhaps, southeast of the Zuider Zee. In the same line with the sand hills, extending past the mouth of the Zuider Zee, runs a chain of islands, namely, Texel, Vlieland, Schelling, Ameland, etc., which seem to indicate the original line of the coast before the ocean broke in upon the low lands. The coast

of Friesland, opposite to these islands, depends for its security altogether on artificial embankments. The highest elevation, 656 feet, is in the extreme southeast. The general aspect of the country is flat, tame, and uninteresting, and about a fifth of the whole surface consists of marsh, sand, heath, or other unproductive land.

Rivers and Canals.—The chief rivers of the Netherlands are the Rhine, Maas (or Meuse), Scheldt and Ijssel. The Rhine is above half a mile wide where it enters the Netherlands; it soon divides, the south and principal arm taking the name of Waal and uniting with the Maas, while the north arm, communicating with the Ijssel, takes the name of Leck; a branch from it named the Kromme (crooked) Rhein, winds by Utrecht to the Zuider Zee, while another very diminished stream called the Old Rhine flows from Utrecht by Leyden to the sea at Katwijk. The Maas, entering the Dutch Netherlands from Belgium, receives the Roer; of the Scheldt only the mouths, the east and the west, or Old Scheldt, lie within the Dutch boundary. The Ijssel, flowing from Germany, enters the Zuider Zee. The navigable canals are collectively more important than the rivers, on which indeed they depend, but they are so numerous as to defy detailed description. The chief are the North Holland Canal, between Amsterdam and the Helder, length 46 miles; and the more important ship canal, 15 miles long, 26 feet deep and 197 wide, from the North Sea to Amsterdam, and connected by locks with the Zuider Zee. (See *Amsterdam.*) Lakes are also very numerous.

Climate, Agriculture, etc.—The climate of the Netherlands is humid, changeable and disagreeable. The mean temperature is not lower than in like latitudes in the British Islands, and the quantity of rain (26 inches) is somewhat less; but the winter is much more severe. As regards rural industries, gardening and agriculture have attained a high degree of perfection. Yet the latter holds a subordinate place in rural industry. Wheat, of excellent quality, is grown only in favored portions of the south provinces. Rye, oats and buckwheat with horse-beans, beet, madder and chicory are more common crops; and tobacco is cultivated in the provinces of Gelderland, South Holland and Utrecht; flax in North Brabant, South and North Holland, Friesland and Zeeland; and hemp, sugar-beet, oil-seeds and hops in various parts of the kingdom. Culinary vegetables are cultivated on a large scale, not merely for the sake of supplying the internal demand, but also for the exportation of the seeds, which for ı an important article of Dutch commerce. But it is in stock (cattle, horses, sheep, swine, goats), and dairy produce in particular, that the rural industry of th· Netherlands shows its strength.

Commerce, Manufactures, etc.—The commerce of the country was at one time the most important in the world, and is even yet of great importance and activity. The external commerce is chiefly carried on with Great Britain, Germany, Belgium, and the Dutch colonies in the East. The imports amount to about $1,000,000,000, the exports to $900,000,000. A considerable portion of the trade is transit, passing through Holland to Germany and other interior countries. The foreign trade centers chiefly in Amsterdam and Rotterdam. The industrial occupations are varied. Shipbuilding and subsidiary trades are among the chief. Of textile manufactures that of linen is the most important; but silks and velvets, as well as woolens and cottons, are produced in considerable quantity. Pigments, brandy, gin, paper, glass, earthenware, etc., are among the more important products. Large numbers of the seaboard population are employed in the deep-sea fisheries. The chief money unit is the florin or guilder=40 cents.

People, Institutions, etc.—The stock to which the people belong is the Teutonic, the great majority of the inhabitants being descendants of the old Batavians. They comprise over 70 per cent. of the population, and are chiefly settled in the provinces of North and South Holland, Zeeland, Utrecht and Gelderland. The Flemings of North Brabant and Limburg, and the Frisians, inhabiting Friesland, Groningen, Drenthe and Overijssel, form the other groups. The majority of the people belong to the Dutch Reformed Church (a Presbyterian body); the remainder being Roman Catholics, Old Catholics, Jews, etc. All religious bodies are on a perfect equality. The government is a constitutional monarchy, the executive being vested in the monarch, and the legislative authority in the States General, sitting in two chambers. The upper chamber, fifty in number, is elected by the provincial councils or assemblies of the eleven provinces; the lower chamber, 100 in number, is elected directly, the electors being all males of twenty-three years of age taxed at a certain figure. The members of the lower house are paid. Elementary schools are everywhere established, and are partly supported by the state, but education is not compulsory. Higher class

schools are in all the chief towns; while there are state universities, namely, at Leyden, Utrecht and Groningen, and the municipal university at Amsterdam. The commercial capital of the country is Amsterdam, but the seat of government and residence of the sovereign is The Hague.

Language and Literature.—The literary language of the Kingdom of the Netherlands is in English called *Dutch*, but by the people themselves is called *Hollandsch* or *Nederduitsch*, that is, Low Dutch. This name it receives in opposition to the *Hochdeutsch* or High Dutch, the literary language of modern Germany. Closely allied to the Dutch is the Flemish language (which see). Both languages belong to the Low German group of the Teutonic or Germanic branch of the Indo-European family of languages. The two languages, or rather dialects, are in fact in their early history identical. What may be strictly called Dutch literature, as distinguished from Flemish, dates from the latter quarter of the sixteenth century. The chief names of this period are those of Coornhert, Von Marnix, Spiegel and Visscher, who did much to polish and regulate the language, and to produce correct models both of prose and verse. Pieter Corneliszoon Hooft (1581-1647) brought the prose style to a high degree of excellence; and Joost van den Vondel (1587-1679), the greatest of Dutch dramatists, performed the same service for the language of poetry. Jacob Cats, familiarly known in Holland as 'Father Cats' (1577-1660), on the other hand, confined himself to the sphere of every-day life. He was distinctively the poet of the people, and his writings are still popular. Among other leading names in pure literature are those of Constantyn Huygens (1596-1686), a satirist, epigrammist and didactic poet; Jacob van Westerbaan (died 1670) and Jan van Hemskork (died 1656), both erotic poets; and Dirk Kamphuisen (died 1626), a celebrated hymn writer. Among dramatists were Brandt (died 1685), who was also an historian and epigrammatist; Oudaan (died 1692), a political writer and lyrist; and Antonides van der Goes (died 1684)), celebrated also as a lyrist. The principal writer of comedies was Bredero (1585-1618). Dutch poetry declined towards the end of the seventeenth century, partly through French influence, but a revival set in with Jacob Bellamy (1757-86). Willem Bilderdijk (1756-1831) shone in all departments of poetry. J. F. Helmers (1767-1813) won great applause by the descriptive poem *De Hollandsche Natie*. Hendrik Tollens (1780-1856) was as a lyrist the avowed favorite of his country, and his *Overwintering der Hollanders op Nova Zembla* is regarded as the best descriptive poem in the Dutch language. An important service was rendered to the literature of his country by Jacob van Lennep (1802-68), who, incited by the example of Scott and Byron, introduced romanticism, and successfully repressed French classicism by his masterly treatment of native tales and historical subjects in narrative poems. The novelists who rank next to Van Lennep are Oltmans, Mrs. Bosboom-Toussaint, and Douwes Dekker (Multatuli). The list of recent Dutch prose writers also includes Schimmel, N. Beets, W. A. van Rees, Weitzel, Lange, J. ten Brink, Opzoomer, Limburg-Brouwer, and the historians Fruin (called the Dutch Motley) and Hofdijk. Dutch names famous in classical learning include those of Erasmus, Lipsius, Grotius, Gronovius, etc.; in science, Huygens, Leeuwenhoek, etc.; in philosophy, Spinoza; and in medicine, Boerhaave.

History.—The southern portion of the Low Countries belonged at the beginning of the Christian era to Belgic Gaul. (See *Gaul.*) The northern portion, inhabited by the Batavians and Frisians (see those articles), formed part of Germany. The southern portion as far as the Rhine was held by Rome up to A.D. 400, after which it came under the rule of the Franks, as did also subsequently the rest of the country. In the eleventh century the territory comprised in the present kingdoms of Belgium and the Netherlands formed a number of counties, marquisates, and duchies corresponding more or less with the modern provinces. By the latter part of the fifteenth century all these had been acquired by the Duke of Burgundy, and passed to the house of Hapsburg on the marriage of the daughter of Charles the Bold of Burgundy to the son of the Emperor Frederick III. On the abdication of Charles V in 1556 they passed to his son Philip II of Spain. In consequence of religious persecution in 1576 Holland and Zeeland openly rebelled, and in 1579 the five northern provinces—Holland, Zeeland, Utrecht, Guelders and Friesland—concluded the celebrated Union of Utrecht, by which they declared themselves independent of Spain. They were joined in 1580 by Overijssel, and in 1594 by Groningen. After the assassination of William of Orange, July 10, 1584, Maurice became stadtholder (governor). His victories at Nieuport and in Brabant, the bold and victorious exploits of the Dutch admirals against the navy of Philip II, the wars of France and England against Spain, and the apathy of Philip II, caused

in 1609 the Peace of Antwerp. But Holland had yet to take part in the Thirty Years War before its independence, now recognized by all the powers except Spain, was fully secured by the Peace of Westphalia (1648). In the middle of the seventeenth century the United Netherlands were the first commercial state and the first maritime power in the world, and for a long time maintained the dominion of the sea. The southern provinces alternated between the rule of Spain and Austria till 1797, when they came under the power of the French republic. In 1806 Louis Napoleon became King of Holland, but abdicated in 1810. In 1814 all the provinces, both of Holland and Belgium, were united by the treaty of London to form the Kingdom of the Netherlands, and the Prince of Orange was placed upon the throne as William I, king of the Netherlands. The artificial union lasted till 1830, when the southern provinces broke away and formed the independent kingdom of Belgium. King William I attempted to reduce the revolted provinces by force; but the great powers intervened, and finally matters were adjusted between the two countries in 1839. (See *Belgium.*) In the following year William I abdicated in favor of his son, William II, a gallant soldier, who had distinguished himself at Quatre Bras and Waterloo. William III came to the throne in 1849, and gave his support to a revision of the constitution, providing a representative government for the country. During his long reign, which ended in 1890, there was bitter party strife centering around the extension of the franchise, the question of religious education in the schools, and heavy taxation resulting from war expenses. The Dutch colonial empire consists of two groups: the Dutch East Indies, comprising Java, part of Borneo, Timor, the Moluccas, Celebes, and the western half of New Guinea; and the West Indies, comprising Dutch Guiana and Curacca. The Dutch East India Company was organized in 1602, and it was in the service of this company that Henry (or Hendrick) Hudson sailed in the *Half-Moon* from Amsterdam in 1609, hoping to force a passage to the East Indies, and instead entered New York Bay and discovered the river that bears his name. A trading post was established at New Amsterdam, now New York, and the Dutch West India Company began to people the new colony, called New Netherland, which remained a Dutch possession till 1664, when King Charles II of England sent a force of soldiers, who vanquished the Dutch defenders, altered the name of the town at the mouth of the Hudson to New York, and ended the dream of a great Dutch colonial empire stretching from French America, then Canada, to Virginia.

The history of the Netherlands from the death of William III in 1890 till the opening of the European war in 1914 is that of steady progress in home affairs. William III was succeeded by his only surviving child, Wilhelmina, but, being a minor, did not assume the government till 1898, when she had reached the age of 18. There was some friction between Great Britain and the Netherlands during the Boer War (1899).

The position of the Netherlands during the European war was one of grave peril. Neutrality was proclaimed at the outbreak of hostilities in 1914, and the Dutch people endeavored to be fair to both belligerents. The sinking by German submarines of several boats belonging to Holland roused a strong feeling among the populace and in addition to making verbal protest on behalf of their seamen the people protested in manifesto against the occupation of Belgium by the Teutons. The government refused to be swayed to depart from their program of neutrality, and the year 1917 found the country ground between the two millstones of the Central Allies and the Entente Allies. Unwilling to let Holland be a channel of communication with Germany the Entente Allies practically established a blockade of the Dutch coast, and what few ships were permitted to go and come were the target for German undersea boats. When the United States engaged in the war an attempt was made to arrange for the supply of food to Holland under guarantees that none of it would go to Germany. The exchange of notes between the countries did not result in a settlement, and meanwhile a great fleet of Dutch merchant vessels was being held in American ports, the United States government refusing to supply bunker coal till negotiations were satisfactorily terminated. For many months the ships lay in the harbors unused, and at last, in March, 1918, President Wilson announced that all the Dutch tonnage in American and Allied ports would be taken over for the period of the war. 'Ample compensation,' said the President in his statement, 'will be paid to the Dutch owners of the ships which will be put into service, and suitable provision will be made to meet the possibility of ships being lost through enemy action.' This act added 1,000,000 tons of shipping to the Allied fleets, which had been badly crippled by the submarine warfare. A total of 77 ships, about 600,000 tons, represented the addition to the

American merchant marine. Holland was the good Samaritan of some 1,200,000 Belgians who had fled over the border from their invaded country. In addition to succoring these, and maintaining an army of 300,000 men to prevent violations of neutrality, Holland gave free use of its railroads for the transportation of the supplies of the Belgian Relief Commission of the United States.

Netherlands Schools of Painting, a general title under which are grouped the Dutch and Flemish schools. Hubert and Jan van Eyck founded the Flemish school about the year 1400. Other famous painters of the early school were Hans Memling, Quintin Mastys and Francis Floris (1520-70). In Peter Paul Rubens (1577-1646), the Flemish school reached its acme. His pupils, Van Dyck and Jordaens, were the equals of Rubens in coloring, but not in conception or spirituality. The founder of the Dutch school was Luke of Leyden (1494-1533). Landscapes and animals were the characteristic subjects of this school. The chief masters in portraiture were Rembrandt and Frans Hals. Painters of peasant scenes included Van Ostade, Terburg, Steen and Van der Meer. Among later Dutch artists are Alma Tadema and Josef Israels. See *Painting.*

Nethersole (ne'ther-sōl), OLGA, actress, born in Kensington, England, in 1870. She first appeared in *Harvest* in 1887. She subsequently became a favorite in England and Australia, and made several visits to the United States, the first in 1894, when she appeared in New York in *Camille.* In subsequent visits she appeared in the roles of *Denise, Juliet, Carmen,* etc.

Netley (net'li), a village of England, in Hampton, 6 miles S. E. of Southampton, on Southampton Water. The Royal Victoria Hospital here was erected in 1857 for the reception of invalids from the troops on foreign service, and from the troops quartered in the military district in the neighborhood. The accommodation is for 1000 patients, but it is capable of being increased. Candidates for medical appointments in the army attend the medical school attached to the hospital, and the female army nurses have also their headquarters here.

Netting (net'ing), a net of small ropes to be stretched along the upper part of a ship's quarter to contain hammocks. Netting also used to be extended along a ship's gunwale to prevent the enemy from boarding.

Nettle (net'l), a genus of plants (*Urtica*) belonging to the nat. order Urticaceæ, and consisting chiefly of neglected weeds, having opposite or alternate leaves, and inconspicuous flowers, which are disposed in axillary racemes. The species are mostly herbaceous, and are usually covered with extremely fine, sharp, tubular hairs, placed upon minute vesicles filled with an acrid and caustic fluid, which by pressure is injected into the wounds caused by the sharp-pointed hairs. Hence arises the well-known stinging sensation when these plants are incautiously handled. Nettles yield a tough fiber which may be used as a substitute for hemp. Nettle-porridge and nettle-broth are dishes made from young and tender nettles cut in March or April. Many species of nettles are known, some of which are common in the United States.

Nettle-rash, or URTICARIA (Latin, *urtica,* a nettle), a common disease of the skin, an eruption closely resembling nettle-stings both as to appearance and as to the sensations it originates. It consists of small wheals, either red or white, sometimes both, having the centers white and the margins red. The disease may be either acute or chronic. When it is acute generally more or less of fever accompanies it. In almost all cases it arises from a disordered condition of the digestive organs, produced either by indigestible food, or in some persons by particular kinds of food which others eat with complete impunity.

Nettle-tree (*Celtis*), nat. order Urticaceæ, a deciduous tree, with simple and generally serrated leaves, much resembling those of the common nettle, but not stinging. It has a sweet fleshy drupaceous fruit. The common or European nettle-tree (*C. australis*) grows to the height of 30 or 40 feet, and is frequently planted for ornament in the south of France and north of Italy. The wood is useful for various purposes. *C. occidentalis,* sometimes called the sugar-berry, is a much larger tree, often attaining a height of from 60 to 80 feet. It is a native of North America from Canada to Carolina. A variety, *C. crassifolia,* is often called hackberry. See *Hackberry.*

Neu-Brandenburg. See *Brandenburg (New).*

Neuburg (noi'burh), a town of Bavaria, on the Danube, 45 miles N. N. W. of Munich. It is a place of great antiquity, and for three centuries (1503-1802) was the capital of the independent duchy of Pfalz-Neuburg. The old ducal residence contains an interesting collection of portraits and armor. Pop. (1905) 8532.

Neufahrwasser (noi'fär-vas-ĕr), a seaport forming a

sort of suburb of Dantzig, from which it is about 3½ miles distant. (See *Dantzig.*) Pop. 8512.

Neufchatel (neu-shä-tel), NEUCHÂTEL (in German *Neuenburg*), a Swiss canton, bounded by France, Vaud, the Lake of Neufchâtel, and Bern, with an area of 312 sq. miles. Neufchâtel was an independent principality as early as 1034. After various vicissitudes it came into the hands of the King of Prussia, as heir of the house of Orange. In 1814 it was received into the Swiss Confederacy, and was the only canton with a monarchical government, which it preserved till 1848. After threatened war in May, 1857, the King of Prussia renounced all his rights in Neufchâtel. Several ridges of the Jura run through the country. The Lake of Neufchâtel, 24 miles long by 8 broad, communicates through the Aar with the Rhine. Grazing and dairy-farming are extensively carried on in the canton; wine, fruits, hemp and flax are produced. The chief manufactures are lace, cotton, watches and clocks (specially at Chaux de Fonds and Locle). The religion is Protestant. The language is French, but German is also spoken. Pop. 125,804.—The capital, which has the same name, lies 24 miles west of Bern, on a steep slope above the northwestern shore of Lake Neufchâtel. It has a castle, formerly the residence of the princes of Neufchâtel and now occupied by the government offices; an old Gothic church of the twelfth century; a gymnasium or college, containing a valuable natural history collection founded by Professor Agassiz, a native of the town, etc. It has various manufactures and an extensive trade. Pop. (1910) 23,525.

Neuhaus (noi'hous), a town of Bohemia, 26 miles northeast of Budweis, on the Nezarka. It has a grand castle of the Czerny family. Pop. 9316.

Neuhäusel (noi'hoi-zl; also ERSEK-UJVAR), a town of Hungary, on the river Neutra. It was formerly strongly fortified, and played an important part in the Turkish wars, but its fortifications were demolished in 1724. It is now merely a market town. Pop. 13,385.

Neuilly (neu-yē), a town of France, practically a suburb of Paris, on the right bank of the Seine, here crossed by Perronet's magnificent bridge. Pop. (1911) 44,616.

Neumünster (noi'mün-stêr), a town of Prussia, province of Schleswig-Holstein, 17 miles S. S. W. of Kiel. It is the center of the railway system of Holstein, and the second industrial town in the province, with cloth factories, etc., and a brisk trade. Pop. 34,558.

Neunkirchen (noin'kirh-ên), or OBER-NEUNKIRCHEN, a town of Prussia, in the district of Treves, on the Blies, 12 miles northwest of Saarbrücken. It lies in a great coal-basin, in which about 4,000,000 tons of coal are raised annually, and has a large iron foundry employing about 3000 hands. Pop. 32,358.—A town in Lower Austria, lying 10 miles southwest of Wiener Neustadt, and with textile and other industries. Pop. 10,831.

Neuralgia (nû-ral'ji-a), the name given to that species of morbid pains which occur only in the course of one or more distinct nerves, and by this locality are distinguished from other pains. In neuralgia of the fifth nerve the pain is in one half of the face, and if the central branch is affected the pain is confined to the upper jaw; neuralgia of the chief nerve of the thigh (*sciatic nerve*) extends along the buttocks and back of the thigh down to the knee, and is called *sciatica*. It also affects the front, back, and outside of the leg, and the whole foot except its inner border; while neuralgia of the intercostal nerves manifests itself in a belt or circle of pain around the breast. The presence of neuralgia almost invariably indicates a weak state of the general system. The most common and best ascertained of the neuralgias are those of the nerves of the skin (*dermalgia*); but nerve pains occur also in other parts, as in the joints, muscles, and in the bowels (*enteralgia*). Many of the internal parts may be the seat of similar local affections; such, for example, are nervous affections of the heart and respiratory organs, which, however, do not usually manifest themselves by acute pain, but by special symptoms. The primary causes of the injury to the nerve producing neuralgia may be very various. It may be inflammation of the nerve itself, a swelling in or upon it, irritation of it produced by an ulcer or suppuration or swelling of the adjacent parts, especially the cavities of the bones, etc. Thin blooded persons and those of weak nerves are most liable to be affected by neuralgia, which varies much both in degree and duration. It is often chronic, and often suddenly occurs during the progress of other acute diseases, as in typhus or intermitting fevers. The treatment also, of course, varies with the nature of the different cases, some admitting of easy cure by the administration of nourishing food, and by the use of iron and quinine, and other tonics, while for others the aid of surgery has to be called in.

Neurapophyses (nū-ra-pof'i-sēs), or NEURAL ARCHES, the name applied to the upper arches which spring from the body of the vertebra, and which by their union form the 'neural canal,' inclosing the spinal marrow.

Neurasthenia (nū-ras-thē'ni-ă), in medicine, a disease of the nervous system, otherwise known as nervous exhaustion. Neurasthenia may result from overwork or worry or from a severe shock. It is more common in women than in men, and the tendency is hereditary. The most marked symptom is increasing inability for any mental or physical exertion; others are gastric disorders, sleeplessness, etc. Treatment involves absolute rest, massage and overfeeding.

Neurin, NEURINE (nū'rin), the nitrogenized substance of nerve fiber and cells, consisting chiefly of albumen and a peculiar fatty matter, associated with phosphorus.

Neuritis (nū-rī'tis), inflammation of a nerve. Tenderness in the course of the nerve and pain occurring in paroxysms are among the symptoms. Paralysis may occur as a result, and in the case of a special nerve of sense loss of the particular sense.

Neuron (nū'ron), NEURONE, the unit of the nervous system, consisting of the nerve cell together with the nerve fiber and all the fibrils. It is estimated that there are over 3,000,000,000 neurons in an adult human being.

Neuroptera (nū-rop'tĕr-a), an order of insects which undergo an incomplete metamorphosis, distinguished by the possession of four well-developed membranous wings, which are generally of equal or nearly equal size. The name Neuroptera ('nerve-winged') is applied to the group in allusion to the large size of the nervures or supporting 'ribs' of the wings, which are very conspicuous and give to the wings a reticulated or network-like appearance. The mouth is generally masticatory, the head large and distinctly separable from the thorax, the antennæ generally slender. The tarsi possess from two to five joints. In general the larvæ are aquatic, the pupa closely resembling the perfect insect. The chief families included in the order comprise the Sialidæ, or alder-flies; the Rhapidiidæ, or snake-flies; the Myrmeleonidæ, or ant lions; the Mantispidæ or mantis flies; the Hemerobiidæ, or aphis lions; the Chrysopidæ, or lace-winged flies; and the Coniopterygidæ, whose wings are covered with a white powder. These are the smallest of the order of Neuroptera.

Neurosis (nū-rō'sis; Gr. *neuron*, a nerve), a name common to diseases of the nervous system unaccompanied by any discoverable alteration in structure, that is to say, *functional* diseases of the nervous system. Hysteria, catalepsy, melancholia, various forms of neuralgia and spasm, are called neuroses.

Neurotic (nū-rot'ik), a term introduced into medicine to indicate some relationship to the nervous system. Thus a neurotic disease is a nervous disease. So, medicines that affect the nervous system, as opium, strychnine, etc., are called *neurotics*.

Neusatz (noi'sătz) a town of Hungary, on the Danube, opposite Peterwardein. Pop. (1910) 33,089.

Neusiedler See (noi'zēd-lĕr zā), or Lake Neusiedl, a lake in the extreme west of Hungary, 28 miles long and 5 broad. It is salt and shallow throughout.

Neusohl (noi'zōl), a town of Hungary, at the confluence of the Gran and the Bistritz, 79 miles north of Pesth. Pop. 9264.

Neuss (nois), a town in Rhenish Prussia, 21 miles northwest of Cologne, on the Erft, near its junction with the Rhine. The church of St. Quirinus (1209) is a fine Romanesque building. Neuss has various flourishing industries, including woolen and cotton machinery and metal goods, and an active trade especially in grain. Pop. 37,224.

Neustadt (noi'stât; 'new town'), the name of numerous places in Germany.—1. NEUSTADT-AN-DER-HARDT, a town in the Palatinate of Bavaria, 14 miles east of Spires, with manufactures of cloth, paper, etc. Pop. 18,576.—2. NEUSTADT, or PRUDNIK, a walled town in Prussian Silesia, 29 miles S. S. W. of Oppeln, with manufactures of damasks, table linen, etc. Pop. 20,187.—3. NEUSTADT-EBERSWALDE, now officially named Eberswalde, a town in Prussia, 28 miles northeast of Berlin. Pop. 21,614.

Neu-Stettin (noi-stet-tēn'), a town of Prussia, in the province of Pomerania, on a small lake, 90 miles northeast of Stettin. It was founded in 1312, and is built after the pattern of Stettin; has manufactures of machinery, etc. Pop. 10,785.

Neu-Strelitz (noi-strā'litz), the capital of the Grand-duchy of Mecklenburg-Strelitz, between Lakes Zierk and Glambeck, 57 miles north of Berlin. It is regularly built in the form of a star, the eight rays of which converge on a spacious market-place, and has a large and handsome ducal palace, partly in the Doric and partly

in the Italian styles, with a library of 80,000 volumes and some good collections. Pop. 11,656.

Neustria (nūs'tri-a), in the geography of the middle ages, the western kingdom of the Franks, in the north of France, so called in opposition to *Austrasia* (Austria, Oestreich), the eastern kingdom of the same. The term is derived from the negative particle *ne* (not), and *Austria*. On the death of Clovis (511) his sons divided his territories into two parts, which received these names. Neustria lay between the Meuse, the Loire, and the ocean. See *France* (*History*).

Neuter (nū'tėr), in zoölogy, a term applied to indicate those insect forms—represented chiefly among the ants, bees and wasps—in which the characteristics of sex are either present in a rudimentary condition or may not be developed at all. Thus among the ants the community consists of males, females, and neuters, or 'workers' as they are also termed. These ant-neuters are simply (sexually) undeveloped females, and upon these forms the performance of all the laborious duties of the ant colony devolves. In the bees the neuters, or workers, are similarly sterile females. The differences between the fertile females and neuters—both of which are developed from fertilized ova—appear to be produced through differences in the food upon which the respective larvæ are fed, and through similar and surrounding circumstances which affect the nutritive development of the larvæ. Plenty of food is thus said to produce females, and a scantier or different dietary males or neuters. See *Parthenogenesis*, *Ant*, *Bee*, *Wasp*.

Neuter, in grammar. See *Gender* and *Verb*.

Neutitschein (noi'tit-shīn), a town of Austria, in Moravia, 26 miles east of Olmütz, on the river Titsch. It lies in a fertile valley peopled by German settlers, and has manufactures of woolen, hats, etc. Pop. 11,891.

Neutra (nū'tra), a town in Hungary, on the river of the same name, 70 miles northwest of Budapest. Part of the town, including the cathedral and bishop's palace, is picturesquely situated on a height surrounded with ramparts and bastions. Pop. 15,169.

Neutrality (nū-tral'i-ti; Latin, *neuter*, neither) means, in the law of nations, that state of a nation in which it does not take part, directly or indirectly, in a war between other nations. To maintain itself in this state a nation is often obliged to assume a threatening position to be able to repel, in case of necessity, every aggression on the part of either of the belligerents. Such neutrality is termed an *armed neutrality*. In maritime wars the treatment of effects of the enemy on board neutral vessels, or neutral effects on board a hostile vessel, gives rise to very important questions. In former times the principle was pretty generally admitted, that the ownership of the goods on board of the vessels was the only point to be considered, and not the property of the vessels themselves. The belligerents, therefore, seized merchandise belonging to the enemy on board of neutral vessels; but they restored neutral property seized under the enemy's flag. But the endless investigations which this system caused, since a consequence of it was the searching of neutral vessels, produced by degrees a new and totally contrary principle, that the flag protects the cargo. The plenipotentiaries of Great Britain, Austria, France, Prussia, Russia, Sardinia and Turkey, assembled at Paris in April, 1856, agreed that the neutral flag should cover an enemy's goods, with the exception of contraband of war; and that neutral goods, with the exception of contraband of war, are not liable to capture under the enemy's flag. In the arbitration (in 1872) at Geneva of the *Alabama* claims of the United States against Great Britain, three rules were agreed to by the parties, to the effect that a neutral government is bound to use due diligence to prevent the fitting out in, or departure from, any of its ports of a vessel which it has reasonable ground to believe is intended to carry on war with a power with which it is at peace; that it is bound not to permit a belligerent to make use of its ports as a basis of naval operations, or a source of recruitment of men or military supplies; that it is bound to exercise due diligence in its own ports or waters, and as to all persons within its jurisdiction, to prevent any violation of these duties and obligations. In the early years of the European war (*q. v.*) Germany contended that the United States should place an embargo on arms and munitions in order to observe 'the true spirit of neutrality.' To this contention Mr. Bryan, then Secretary of State, replied that to inhibit the trade of arms during the war would be 'a direct violation of the neutrality of the United States.'

Neutralization (nū-tral-i-zā'shun), in chemistry, the process by which an acid ar an alkali are so combined as to disguise each other's properties or render them inert.

NEVADA
Scale of Miles
0 10 20 30 40 50 60 70 80
Railroads
Railroads Projected
State Capital
Indian Reservations
Forest Reservations
Size of type indicates relative importance of places
C.S.HAMMOND & CO., N.Y.
Lovelocks
Carson
Carson L.
Humboldt L.
Winnemucca
Black Butte
Sulphur
Rosebud Mts.
Humboldt R.
Mt. Tenabo
Mt. Airy
Austin
Austin Mts.
Ruby Hill
Prospect
Eureka
Hamilton
Ely
Cleveland
Shoshone Range
Patterson
Sunnyside
Whiterock Geyser
Preston
Lund
Duckwater
Manhattan
Tybo
Hot Creek
Clifford
Stone Cabin
Hannapah
Reveille
Bellehelen
Golden Arrow
Silverton
Goldfield
Diamondfield
Columbia
Mt. Oddie
Tonopah
Belmont
Morey
Railroad Valley
Big Smoky Valley
Monitor Range
Toiyabe Mts.
Toquima Range
Reese R.
Newlands
Ursine
Ploche
Highland Range
Callente
Delamar
Alamo
Las Vegas
Arden
Spring Mts.
Charleston Pk.
Corn Creek
Indian Springs
Dry Lake
Pahrump
Manse
Mesquite
Bunkerville
Gold Butte
Virgin R.
Virgin Mts.
Gold Mts.
Beatty
Gold Center
Bullfrog
Bullfrog Hills
Amargosa R.
Death Valley
Furnace Creek
Owens Lake
Keeler
Skidoo
Emigrant Springs
Darwin
Wild Rose
Ballarat
Millspaugh
Greenwater
Shoshone
Zabriskie
Tecopa Sta.
Borax Flats
Crackerjack
Dumont
Valjean
Riggs
Silver Lake
Berry
Soda Lake
Ames
Elora
Hadeen
Johannesburg
Atolia
Searles
Freeman
Owens L.
Alabama Hills
Olancha
Halwee
Lone Pine
Whitney
Inyo
Mt. Whitney
Citrus
Thebe
Independence
Millwood
Reedley
Dunlap
Mattermore
Pollasky
Clovis
Fresno
Hammond
Minerai
King
Three Rivers
Exeter
Lindsay
Tulare
Armona
Hanford
Huron
Coalinga
Kettleman Hills
Avenal
Lemoore
Laguna Seca Range
Gabilan Range
Diablo Range
Temblor Range
Panoche Valley
Cuyama R.
Cuyama Valley
Caliente Range
Tehachapi Mts.
Tehachapi
Mojave
Kingman
McConnico
Quartzite
Chloride
White Hills
Eldorado Canyon
Nelson
Searchlight
Crescent
Yellow Pine
Hard Cash
Black Hills
Sutor
Jean
Borax
Roach
Las Vegas Valley
Spring Mts.
Charleston Pk.

Neutral Salts (nū'tral), salts in which all the hydrogen atoms capable of replacement by acid or basic radicals have been so replaced.

Neutral Tint (nū'tral), a pigment used in water colors, of a dull grayish hue partaking of the character of none of the bright colors. It is prepared by mixing together blue, red and yellow in various proportions.

Neuwerk (noi'verk), a town, Rhenish Prussia; 14 miles west of Düsseldorf. It has textile manufactures. Pop. (1910) 12,350.

Neuwied (noi'vēt), a town of Rhenish Prussia, 8 miles below Coblentz, on the Rhine. It contains an historic castle surrounded with extensive gardens, and famous Moravian schools. Pop. (1910) 19,107.

Neva (nē'va), a river of Russia, which issues from Lake Ladoga, and after a westerly course of about 40 miles flows into the Gulf of Finland below Petrograd, by several mouths. It is generally frozen over from October to April. Its commercial importance is enhanced by canals, which connect it with remote parts of the empire.

Nevada (nē-vä'dà), one of the United States, bounded N. by Oregon and Idaho, E. by Utah and Arizona, S. W. and W. by California; area 110,690 sq. miles. Nearly the whole State belongs to the 'Great Basin,' the waters of which do not reach the sea, and which consists of a series of long narrow basins, separated from each other by steep and rugged mountains. These include the slopes of the Sierra Nevada on the west, and several other groups, such as the Humboldt River Mountains, Diamond Mountains, Shoshone Mountains, etc. There are several salt lakes, including Lakes Walker, Carson and Pyramid. The chief river, besides the Colorado, is the Humboldt River. The rivers lose themselves in the soil or enter the salt lakes. Much of the State is very arid, but it includes tracts such as the charming Carson Valley, rich both in vegetation and mineral wealth. The climate is healthy, but marked by great extremes. The principal industry of the State up to this time is mining. Silver is the chief mineral product, and the mines of the Comstock Lode have been among the richest in the world. Gold is also found, and copper, lead and zinc in small quantities. Solid masses of salt of great purity are abundantly found in many places. There are numerous mineral springs and also geysers. Only a comparatively small area is suitable for tillage, but it is believed that several millions of acres can be reclaimed by irrigation, and works for this purpose are being constructed. The soil, when reclaimed, is well adapted for forage crops, cereals, vegetables and deciduous fruits. Stock raising is extensively carried on throughout the State and there is much good pasturage. The railroads serving the State include the Southern Pacific, the Los Angeles & Salt Lake, the Western Pacific, the Tonopah & Goldfield, the Nevada Northern, Nevada Central, Eureka Nevada, Virginia & Truckee, etc. The capital is Carson City, but Reno is the largest city. Its educational institutions include the University of Nevada, at Reno (established in 1885; 430 students); State School of Mines; College of Agriculture and Mechanic Arts, with Experimental Station, etc. Pop. (1900) 42,335; (1910) 81,875; (1920) 77,407.

Nevada, a city, county seat of Vernon Co., Missouri, 90 miles S. of Kansas City, on Kansas, Missouri & Pacific and Missouri, Kansas & Texas R.Rs. Has lumber and flour mills, zinc smelters, carriage factories, foundry, galvanized iron works, etc. It is the seat of the Cottey College for Women. The State hospital for the insane is here. Radio Springs Park is a prominent feature of the city. Pop. (1920) 7139.

Nevers (ne-vâr), France, on the right bank of the Loire, at the confluence of the Nièvre, 153 miles S. S. E. Paris. It is the see of a bishop, and has a cathedral (in part dating from the eleventh century, restored 1883), a somewhat heavy building; the ducal palace, now used by the courts of justice; a hôtel de ville, etc. Nevers has important industrial establishments, including potteries and porcelain works, producing ware which has long been famed. The navy cannon foundry, the largest ordnance foundry in France, was in 1880 turned into a practical school for boiler making and engine fitting. Pop. 26,673.

Neviansk (ne-vi-ansk'), a town of Russia, in the government of Perm, about 60 miles northwest of Ekaterinburg. It is situated on the eastern slope of the Ural Mountains, in a district rich in iron and auriferous sand, and is the center of the important iron works in the populous valley of the Neva. Pop. 17,950.

Nevis (nev'is), a small island of the British West Indies, belonging to the Leeward group, and lying off the southwest extremity of St. Kitts, from which it is separated by a channel 2 miles broad. It is a beautiful spot, little more than a single mountain, which rises 2500 feet from the sea, about 24 miles in circumference; area, 24,640 acres. It is of

volcanic origin, is well watered and in general fertile, producing sugar, which, with molasses and rum, forms the sole export. The principal town is Charleston. Pop. 12,774.

New. For names beginning with this adjective not given here, see the articles under the name which follows it.

New Albany, a city of Indiana, capital of Floyd Co., on the Ohio River, nearly opposite Louisville, Ky., with which it is connected by bridges. It is the seat of DePauw (Women's) College, organized in 1850, and has a national cemetery. It has a large shipping and supply trade. Pop. (1910) 20,629; (1920) 22,992.

New Amsterdam, Dutch colonial name for Manhattan Island, now borough of New York. The earliest Dutch settlers appeared about 1623. See *Dutch West Indies.*

Newark (nū'ärk), a city of Ohio, capital of Licking Co., on the Licking River, 33 miles E. by N. of Columbus, and on the Ohio Canal and several railroads. It is in a grain, wool and live-stock region, and has railroad and locomotive shops and extensive manufacturing industries, its products embracing engines and boilers, cars, glassware, agricultural implements, bentwood, foundry and machine shop products. In the vicinity are extensive and striking examples of the works of the mound builders. Pop. (1910) 25,404; (1920) 26,718.

Newark, a city and port of New Jersey, the seat of Essex Co., 9 miles west of New York City, finely situated on the west side of Passaic River, about 4 miles from its mouth in Newark Bay. It is the largest city in the State, and is regularly laid out with wide straight streets, generally intersecting at right angles. Broad Street, the principal thoroughfare, is more than 120 feet broad, shaded with elms, and divides the city into two nearly equal parts. It contains few notable public buildings, but several of its business establishments are housed in imposing buildings, and it has some handsome churches and a number of educational institutions. Here is the New Jersey Historical Society. Newark is distinguished as a manufacturing town, the works including a very large cotton-thread factory, a sewing machine factory, and manufactures of furniture, machinery and castings, leather, boots and shoes, saddlery, oilcloth, hardware, clothing, india-rubber goods, a large number of extensive breweries, etc. There is a considerable coasting trade and constant steamboat communication with New York, while there is a network of steam and electric railways; also subway communication with New York. It has a number of fine parks. Pop. (1910) 347,469; (1920) 414,216.

Newark, a village in Wayne Co., New York, 30 miles S. E. of Rochester. It has railroad shops, canneries and extensive nurseries, and manufactures of tin, gloves, paper-boxes, etc. Pop. (1920) 6964.

Newark-upon-Trent, a municipal borough of England, in Nottinghamshire, on a branch of the Trent, 17 miles northeast of Nottingham. The corn market is one of the largest in the kingdom. Iron founding, brass founding, brewing, and the manufacture of boilers and agricultural implements are carried on. Newark returned two members to Parliament until 1885; it now gives name to a parliamentary division. Pop. 16,412.

New Bedford (bed'fĕrd), a city and port of Massachusetts, 55 miles south from Boston, on the estuary of the Acushnet, which opens into Buzzard's Bay. It is connected by bridges with Fairhaven, and is noted for the elegance of its private residences and its handsome public buildings. Its public library is one of the oldest institutions of the kind in this country. Until the middle of the nineteenth century it was largely engaged in the whale fishery. It is now an active manufacturing city, some of its cotton and yarn mills being among the largest in the world. It ranks first in this country in the production of fine cotton goods. It has also iron and copper, oil and candle works, boot and shoe factories, and many other industries. Pop. (1910) 96,652; (1920) 121,217.

New Bern (nu'bĕrn), a city of North Carolina, county seat of Craven County, the port of entry for Pamlico district, on the estuary of the Neuse, which opens into Pamlico Sound. A large traffic in early vegetables for the northern markets is carried on. It also ships large quantities of cotton, lumber, and naval stores and has important fisheries. It was founded by Swiss settlers in 1710 and was formerly State capital. Pop. (1910) 9961; (1920) 12,198.

Newberry, a town, capital of Newberry Co., South Carolina, 47 miles W. N. W. of Columbia. It has manufactures of cotton, cottonseed oil, fertilizers, etc., and is an important market for cotton. Pop. 5894.

New Brighton (brī'tun), a rising watering place in Cheshire, England, 4 miles north of Birkenhead. It has excellent bathing. Pop. 5000.

New Brighton, a borough of Beaver County, Pennsylvania, on Beaver River, near its entrance into the Ohio, and 28 miles N. W. of Pittsburgh. The river affords abundant water power, and there is a supply of natural gas. The manufactures include sanitary wares, porcelain, pottery, etc. Pop. (1920) 9361.

New Brighton, a former city of New York, on the N. E. shore of Staten Island, 6 miles S. W. of Manhattan Island. It now forms part of the borough of Richmond, New York City, and contains many handsome residences of New York business men. Here is the Sailors' Snug Harbor, for aged and disabled seamen, and an institution for destitute children of seamen.

New Britain (brit'n), the largest of a group of islands in the Bismarck Archipelago, east of New Guinea in the Pacific Ocean. Allocated to Australia in 1918; formerly owned by Germany.

New Britain, a city of Hartford Co., Connecticut, 10 miles S. W. of Hartford. Its manufactures are extensive, including hardware, cutlery, hosiery, cold rolled steel, registers, shirts, etc. Here are the State Normal and State Trade schools. New Britain was originally a part of Berlin; but was incorporated in 1850. Pop. (1910) 43,916; (1920) 59,316.

New Brunswick (brunz'wik), a province of the Dominion of Canada, on the east coast of North America; bounded west by the State of Maine; northwest by the province of Quebec; north by Chaleur Bay; east by the Gulf of St. Lawrence and Northumberland Strait, the latter separating it from Prince Edward Island; and south by the Bay of Fundy and part of Nova Scotia; area, 27,322 square miles, or about the same as the mainland of Scotland. Its coast line is interrupted only at the point of junction with Nova Scotia, where an isthmus of not more than 14 miles in breadth connects the two territories, and separates Northumberland Strait from the Bay of Fundy, which it is proposed to unite by means of a canal. The general surface of the country is level, but hilly in the northwest. The principal rivers are the St. John, 450 miles in length, and navigable for vessels of 100 tons to Fredericton, 90 miles from its entrance into the Bay of Fundy; and the Miramichi, 225 miles in length, which falls into the bay of the same name, and is navigable for large vessels 25 miles from the gulf. There are a number of lakes, the largest, Grand Lake, being 25 miles long by about 5 miles broad. Coal is plentiful, and iron ore abundant; the former is found over 10,000 square miles, or more than one-third of the whole area. Copper, manganese, gypsum, limestone and freestone abound. The climate, like that of other portions of Canada, is subject to extremes of heat and cold, but is, on the whole, healthy. After agriculture, lumbering and fishing are the main occupations of the inhabitants, though many are engaged in mining and manufacturing. A very large portion of the soil is well adapted for agriculture, but only about one-tenth of the land suitable for agriculture has yet been taken up. Great attention has of late years been paid to the improvement of live stock. New Brunswick is very largely wooded, and the forests supply three-fourths of the total exports. The fisheries are of great value. The minerals exported include coal, gypsum, antimony ore, copper ore, manganese, plumbago and unwrought stone. Owing to its cheap coal and proximity to the markets of the United States and Europe, New Brunswick may develop as an important manufacturing country. Discovered by Sebastian Cabot in 1498, it formed, with Nova Scotia, the French colony of Acadia (1604-1713), was erected into a separate province in 1784, and in 1867 became a province of the Dominion of Canada. The capital is Fredericton, but the chief commercial centre is St. John, which has one of the finest harbors on the North Atlantic. Pop. 351,889.

New Brunswick, a city, county seat of Middlesex Co., New Jersey, on the Raritan River, at the head of navigation, 31 miles S. W. of New York. It is the seat of Rutgers College (organized 1766; 500 students); Rutgers Preparatory School, and a Dutch Reformed Theological Seminary. The New Jersey Experimental Station is here. It has large potash plant, and extensive manufactures of hosiery, musical strings, rubber goods, machinery, automobiles, knitting needles, metal and brass specialties, wall paper, and many other products. The Raritan is to be deepened, to make New Brunswick a seaport. Pop. (1910) 23,388; (1920) 32,779.

Newburgh, a city of Orange County, New York, on the W. bank of the Hudson River, 57 miles N. of New York city, with good railroad and steamer service. It is built on high ground commanding a fine view of the river and the Highlands. It has a large river trade in dairy and farm products, manufactures of cotton goods, woolen

goods, hats, carpets, boilers, steel boats, etc. It has several academic institutions. It was the headquarters of Washington during the Revolutionary war, and here the American army was disbanded in the latter part of 1783. Pop. (1910) 27,805; (1920) 30,366.

Newburgh (nū'burg), a former village of Cuyahoga Co., Ohio, adjoining Cleveland, of which city it now forms a part.

Newbury (nū'ber-i), a municipal borough in Berkshire, England, 52 miles west of London, on the Kennett, which is made navigable to Reading, and joins the Thames. There are malting establishments and corn mills, and a considerable traffic is carried on by the Kennet and Avon Canal. In 1643 and 1644 battles were fought in the vicinity between the Royalists and the Parliamentarians, both resulting in victory for the Royalists. Pop. 12,108.

Newburyport (nū'be-ri-pōrt), a city and port of Massachusetts, one of the capitals of Essex County, at the mouth of the Merrimac, and 35 miles N. N. E. *of* Boston. It contains a city hall, a marine museum, homes for aged men and women and destitute children, the Putnam Free School, etc. It has cotton, cloth and yarn mills, large saw and planing mills, and extensive manufactures of machinery, boots and shoes, combs, celluloid goods, cordage, silverware, etc. Pop. (1910) 14,949; (1920) 15,618.

New Caledonia (kal-e-dō'ni-a), an island in the Pacific, situated about 800 miles east of Australia. It was discovered by Captain Cook in 1774, and appropriated by the French as a convict settlement in 1854. The capital is Noumea, near the south end of the island, with a fine harbor. The island is mountainous, well watered and wooded, and yields all sorts of Polynesian produce. The climate is hot but healthy. There are nickel mines, and also mines of copper and cobalt, considerable quantities of which are raised and exported, as also chrome, copra, coffee, etc. With the adjacent Loyalty Islands the area is estimated at 6724 square miles, and the population at 51,415. Including settlers and miners, officials and troops, and convicts and their families, the white population numbers about 22,000. The native population, of Melanasian race, and cannibals in habit, have diminished greatly since the French occupation. The attempt of the French to work the settlement both as a free and as a penal colony has not hitherto answered well; and the frequent escape of convicts to Australia has been a continual source of local trouble and international dispute.

Newcastle (nū'kas-tl), the principal shipping port of New South Wales after Sydney, situated at the mouth of the Hunter River, upon ground rising somewhat steeply from the sea. It is a well laid out, well built, and progressive town. Pop. (1911) 57,650.

New Castle, a city, county seat of Lawrence County, Pennsylvania, 50 miles N. W. of Pittsburgh, with six streams suitable for manufacturing purposes, and served by six railroads; an industrial and freight-distributing center, with extensive manufacturing interests. Its products include cars, tin plate, dynamite, paper, flour, etc. It has also large rolling mills, iron foundries, etc. Pop. (1910) 36,280; (1920) 44,938.

New Castle, a city and port of delivery of New Castle Co., Delaware, on the Delaware River, 6 miles below Wilmington. It has fishing and manufacturing interests. It was settled by the Swedes, who were driven out by the Dutch, who in turn were superseded by the English. Pop. 3944.

New Castle, a city, county seat of Henry Co., Indiana, on the Blue River, 45 miles east of Indianapolis. Its industries include automobile, piano and furniture factories, rolling mills, rose culture, etc. Pop. 14,458.

Newcastle-under-Lyme, a municipal and parliamentary borough of England, Staffordshire, close to the Potteries, and 10 miles N. N. W. of the town of Stafford. Coal and iron works are carried on in the neighborhood, giving employment to a large number of the inhabitants, most of whom, however, find work in the Potteries. In the town itself a few industries are carried on, such as brewing, malting, tanning and paper making. By canal it is connected with the Trent, Mersey, Severn and Thames. Pop. (1911) 20,204.

Newcastle-upon-Tyne, a municipal and parliamentary borough, river port, and episcopal city in the county of Northumberland, England, but forming a county in itself. It stands on the north bank of the Tyne, about 9 miles from its mouth, and 276 miles by railway from London. Among the public buildings are the Cathedral of St. Nicholas, an ancient Gothic structure; the Roman Catholic Church and Cathedral of St. Mary, a modern building in the early English style; the town hall, a handsome modern edifice; the Moot Hall, in which the assizes for the county are held; the castle,

one of the finest specimens of castellated Norman in England, recently restored; the Central Railway station, an imposing building; the public library (opened 1882); and the General Market. Among the educational institutions the chief are the College of Medicine and Surgery; and the College of Physical Science, in connection with Durham University. Newcastle, owing to the rich mineral products of the neighborhood, has attained a first position among the great centers of British enterprise. Some of the more important of its industries are ship building, and the manufacture of locomotive and marine engines, cannon, shot, tools, firebricks, hemp and wire ropes, cables, anchors, sails, etc. Situated in the midst of one of the largest coal fields in England, it exports immense quantities of coal. Newcastle is one of the Tyne ports (which include also North and South Shields). During the past few years vast improvements have been made on the river, and all the way between Shields and Newcastle there is now a depth of 20 feet at low water. (See *Tyne.*) Newcastle is situated at the eastern termination of the wall of Hadrian, and Roman antiquities have been repeatedly discovered in it. The castle or fortress was built by Robert, son of William the Conqueror, about 1080, about which time it received its present name. Newcastle was a frequent object of attack in the wars between England and Scotland. It was taken possession of by the Scottish Covenanting army in 1640 and in 1644, and in 1647 Charles I was delivered here by the Scottish army to the parliamentary commissioners. Pop. (1911) 266,671.

Newchwang (nū-chwäng'), a city of China, in Manchuria, on the Liao River, about 35 miles from its mouth. It is practically an inland city, but was chosen as one of the ports to be opened to foreign commerce by the Treaty of Tien-tsin. It is the chief port of Manchuria and has an immense commerce, exporting grain, beans, ginseng, deer horns, liquorice and provisions. The foreign settlements and the trade, however, are necessarily at Ying-tze, near the river's mouth. Pop. estimated at 40,000 to 60,000.

Newcomb (nū'kom), SIMON, astronomer, born at Wallace, Nova Scotia, in 1835; died in 1909. He came to the United States in 1853, was graduated at the Lawrence Scientific School in 1858, and in 1861 was made Professor of Mathematics in the United States navy, being assigned to the Naval Observatory at Washington. While there he negotiated for the 26-inch telescope authorized by Congress and superintended its construction. He was appointed to observe the transit of Venus in 1874, was made superintendent of the *Nautical Almanac* in 1877, and became professor of mathematics and astronomy at Johns Hopkins University in 1894. His later years were spent in independent research. He made important discoveries in astronomy and wrote *Popular Astronomy*, *A Course of Mathematics*, *Principles of Political Economy*, etc.

Newcomen (nū-kom'en), THOMAS, a locksmith at Dartmouth, in Devonshire, towards the close of the seventeenth century, and one of the inventors of the steam engine. Newcomen conceived the idea of producing a vacuum below the piston of a steam engine after it had been raised by the expansive force of the steam, which he effected by the injection of cold water to condense the vapor. The merit of first applying the steam engine to practical purposes is thus due to Newcomen, who, in conjunction with Captain Savery and John Cowley, took out a patent for the invention in 1705. See *Steam Engine.*

New Decatur, the former name of a city of Morgan Co., Alabama. It is now called Albany. The population in 1920 was 7652. See under *Albany.*

Newel (nū'el), the central space or column round which the steps of a circular staircase are wound. When there is no central pillar the newel is said to be open.

Newell, ROBERT HENRY, humorist, born at New York in 1836; died in 1901. He became a journalist and editor in New York and was widely known for his humorous and satiric '*Orpheus C. Kerr*' papers (5 vols. of letters on Civil war topics). He also wrote novels, poems, etc.

New England (iug'gland), the northeast portion of the United States, comprising the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut. Originally called North Virginia when granted by James I to the Plymouth Company in 1606, it received the name of New England from Captain John Smith, who explored and made a map of the coast in 1614.

New Forest (for'est), a large tract in England, in the southwest of Hampshire, forming one of the royal forests, about 60 miles in circuit, which is commonly said to have been laid waste and turned into a forest

by William the Conqueror. It contains within its limits portions of cultivated land belonging to private persons. The public portions are partly inclosed, partly uninclosed, and present much fine sylvan scenery. There are several villages within the forest area, Lyndhurst being the forest capital. Oak and beech are the principal trees.

Newfoundland (nū'fund-land), a large island of British North America, in the Atlantic Ocean, at the mouth of the Gulf of St. Lawrence, and nearer to Europe than any other part of America—the distance from the port of St. John's to the harbor of Valentia, in Ireland, being only about 1918 miles. Area, excluding the territory of Labrador on the mainland, which belongs to this colony, 40,000 square miles (or nearly 10,000 more than Ireland). It is of extremely irregular form, with a coast line, particularly on the southeast and south, broken up in a remarkable manner by broad and deep bays, harbors, coves, inlets and lagoons.

The interior is much intersected by rivers and lakes, exhibits many barren tracts, and is but thinly wooded except on the banks of the rivers; nevertheless there is much more land suited for settlement than was once supposed, and the forests as a whole are valuable. The largest rivers are Humber River and the river Exploits; the largest lakes Grand Pond and Indian Lake. The minerals comprise coal, gypsum, copper, lead, nickel, silver, iron and gold. Copper exists in large quantities, and is worked to a greater extent every year. The winter is long, severe and damp, and the summer is dry, short and hot; but the climate, though severe, is healthful, the mortality among the inhabitants being lower than in most parts of the American continent. The principal trees are pine, spruce, birch, willow and mountain-ash. The crops generally are abundant, particularly potatoes. Grain crops also thrive well in parts, wheat having been known to yield 50 bushels per acre; but both climate and soil are more favorable to pasturage and green crops than to grain. Dairy farming is being introduced, and agriculture is sure to receive more attention in the future. In the valleys on the western coast are large tracts, now almost wholly unoccupied, capable of being converted into fairly productive grazing land, but waiting for the construction of railways. The southeastern portion is the most thickly settled. The wild animals are the caribou or reindeer, bear, wolf, hare, beaver, marten, wild cat, etc.

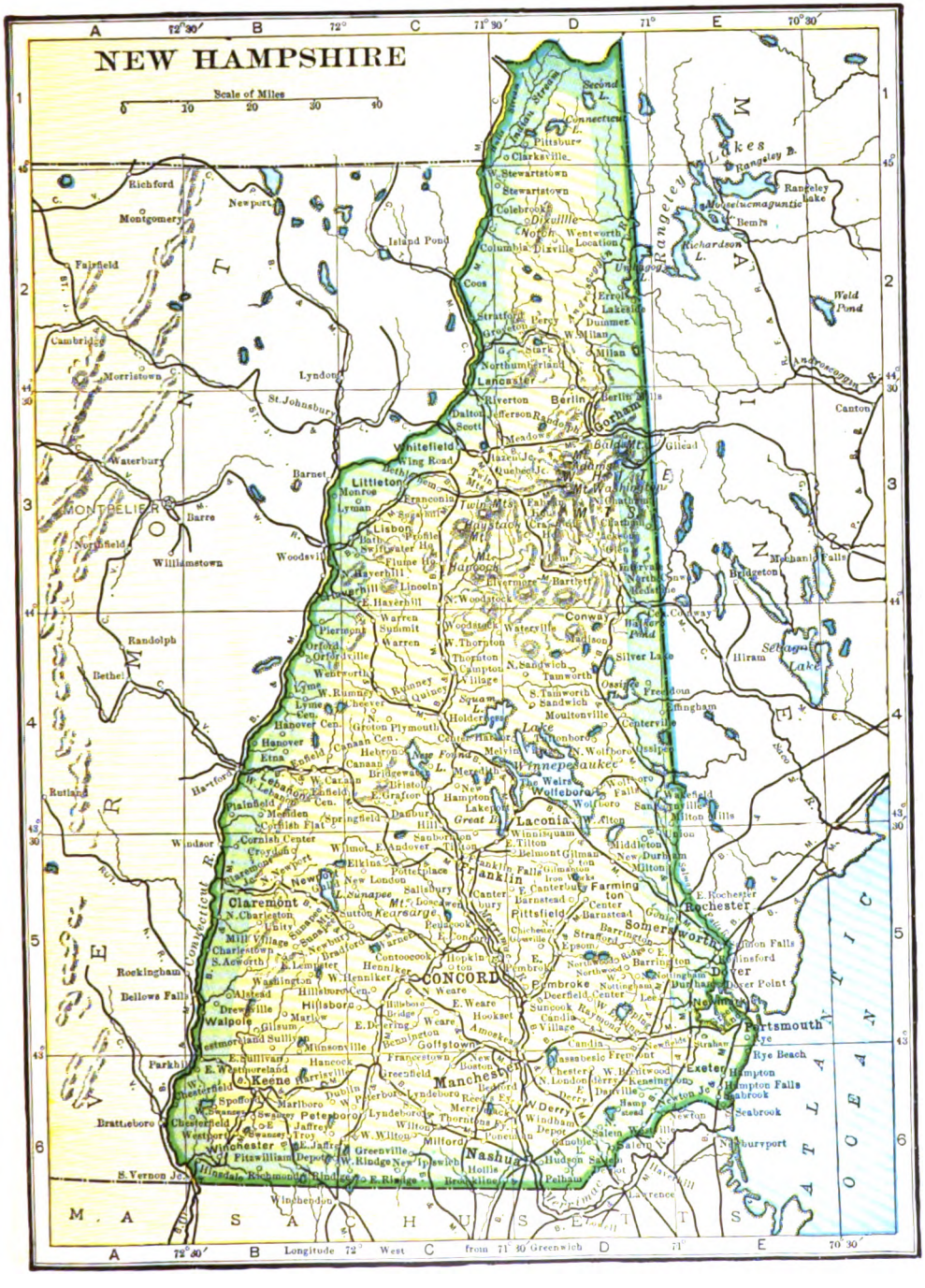
The famous banks of Newfoundland around the coasts swarm with almost every variety of fish, particularly cod. The cod fishery is prosecuted from June to November, and may be said, with the other fisheries, of seal, lobster, herring and salmon, to form the staple occupation of the inhabitants. Cod fish is far the largest export. The trade is chiefly with Britain, Canada and the United States. The original Atlantic cable lands in Heart's Content Harbor. Newfoundland was discovered by John Cabot in 1497, and the first English colony was planted in 1621. A struggle for supremacy took place between the English and the French; but in 1713 Newfoundland and its dependencies were declared, by the Treaty of Utrecht, to belong wholly to Great Britain, the French reserving a right to fish and cure on certain parts of the coast. Responsible government was granted in 1833. The colony, as yet, declines to join the Canadian Confederation. The only noteworthy town on the island is St. John's, the capital. Pop. 254,587.

Newfoundland Dog, supposed to have come originally from Newfoundland, where it is employed by the natives as a beast of burden. It is the largest, the most courageous, and by far the most intelligent of the water-dogs.

Newgate (nū'gāt), a historical jail of the city of London, at the west end of Newgate street, mentioned early in the thirteenth century. It was destroyed in the great fire of 1666, but rebuilt in 1770. After 1877 Newgate ceased to be used as a prison, and it was demolished in 1904.

New Glasgow, a town of Picton Co., Nova Scotia, Canada, on the East R., near its entrance. It has extensive ship-building yards, and a large shipping trade. The main products are wire, nails, steel, leather, pottery, glass, etc. Pop. (1911) 6383.

New Guinea (gin'ē), or PAPUA, a large island in Australasia, next to Australia, of which it lies north, the largest on the globe; area, 305,900 square miles; length about 1500; breadth from 200 to 400 miles. It is separated from Australia on the south by Torres Strait, and from the Moluccas on the west by Gilolo Passage. The coasts are for the most part lofty, with mountains coming close to the sea, but in the neighborhood of Torres Strait the shore presents the appearance of a marshy flat covered with dense forests. In the interior there are still loftier mountains, covered with perpetual snow, and volcanoes. In the southeast end


NEW HAMPSHIRE
Scale of Miles
0 10 20 30 40
Longitude 72° West from 71° 30 Greenwich
Concord
Manchester
Nashua
Portsmouth
Keene
Claremont
Laconia
Berlin
Lancaster
Littleton
Lebanon
Rochester
Dover
Somersworth
Franklin
Hanover
Newport
Walpole
Winchester
Hillsboro
Peterboro
Milford
Exeter
Hampton
Seabrook
Newburyport
Rangeley Lakes
Rangeley Lake
Richardson L.
Second L.
Connecticut L.
Umbagog L.
Weld Pond
Androscoggin R.
Connecticut R.
Merrimack R.
Piscataqua R.
Saco R.
Ossipee Lake
Winnipesaukee
Squam L.
Newfound L.
Great D.
Kearsarge Mt.
Sunapee Mt.
Mt. Washington
Presidential Range
Twin Mts.
Franconia Mts.
Haystack Mt.
Moosilauke
Kinsman Mts.
Carter Mts.
Green Mts.
Ossipee Mts.
Belknap Mts.
Uncanoonuc Mts.
Pawtuckaway Mts.
Monadnock
Sunapee
Kearsarge
Hillsborough
Merrimack
Rockingham
Strafford
Carroll
Coos
Grafton
Cheshire
Sullivan
Belknap
Hillsboro
Merrimack
Rockingham
Strafford
Carroll
Coos
Grafton
Cheshire
Sullivan
Belknap
Montpelier
Barre
Waterbury
Williamstown
Woodsville
Randolph
Bethel
Rutland
Windsor
Springfield
Cornish Flat
Claremont
Newport
Charlestown
Rockingham
Dellows Falls
Walpole
Westmoreland
Parkhill
Keene
Brattleboro
Chesterfield
Winchester
Fitzwilliam Depot
S. Vernon Jc.
Hinsdale
Winchendon
Richford
Montgomery
Fairfield
Cambridge
Morristown
Lyndon
St. Johnsbury
Island Pond
Newport
Barnet
Littleton
Lisbon
Woodsville
Haverhill
Lincoln
Whitefield
Waterville
Conway
Bridgton
Harrison
Canton
Mechanic Falls
Hiram
Sebago Lake
Gilead
Berlin Mills
Riverton
Dalton
Jefferson
Scott
Stark
Milan
Columbia
Colebrook
Dixville
Wentworth Location
Errol
Lakeside
Dummer
Percy
Stratford
Coos
Northumberland
Lancaster
Lyndon
St. Johnsbury
Waterbury
Barnet
Littleton
Monroe
Lyman
Lisbon
Bath
Profile
Franconia
Sugar Hill
Twin Mts.
Fabyan
Crawford
Jackson
Glen
Harrisville
Bartlett
Intervale
Conway
Madison
Eaton
Freedom
Effingham
Silver Lake
Tamworth
Ossipee
Moultonville
Centre Harbor
Melvin
Meredith
Winnisquam
Tilton
Belmont
Gilman
Franklin Falls
Canterbury
Farmington
Barnstead
Pittsfield
Epsom
Chichester
Loudon
Pembroke
Suncook
Deerfield
Candia
Raymond
Epping
Nottingham
Barrington
Dover
Durham
Newmarket
Exeter
Hampton
Seabrook
Newburyport
Rye
Rye Beach
Hampton Falls
Kensington
Derry
Windham
Salem
Hudson
Nashua
Pelham
Hollis
Brookline
Milford
Amherst
Goffstown
Bedford
Manchester
Hooksett
Pembroke
Concord
Henniker
Hillsboro
Deering
Weare
Contoocook
Hopkinton
Warner
Bradford
Newbury
Sunapee
Mt. Kearsarge
Claremont
Unity
Charlestown
Alstead
Drewsville
Walpole
Gilsum
Marlow
Surry
Keene
Harrisville
Dublin
Peterboro
Lyndeboro
Wilton
Greenville
Mason
Jaffrey
Troy
Swanzey
Marlboro
Spofford
Chesterfield
Westport
Hinsdale
Richmond
Winchendon
Fitzwilliam Depot
Winchester
Brattleboro
Parkhill
Westmoreland
Walpole
Dellows Falls
Rockingham
Charlestown
Claremont
Newport
Windsor
Cornish Flat
Springfield
Plainfield
Cornish
Meriden
Lebanon
West Lebanon
Enfield
Canaan
Hanover
Etna
Lyme
Orford
Piermont
Warren
Wentworth
Rumney
Ellsworth
Plymouth
Groton
Hebron
Bridgewater
Bristol
Alexandria
Danbury
Hill
Andover
Salisbury
Boscawen
Penacook
Concord
Pembroke
Suncook
Epsom
Pittsfield
Barnstead
Center Barnstead
Farmington
Rochester
Somersworth

Mount Owen Stanley rises to the height of 13,205 feet; farther west and near the north coast Mount Schopenhauer reaches 20,000 feet. The island is rich in tropical products, possesses a copious and peculiar flora and fauna (birds of paradise being especially numerous and gorgeous), and is suitable for tropical agriculture. The coast is miasmatic in many places; the mountainous interior is reported healthier. On the west coast are numerous Malay settlements, but the

Natives of New Guinea.

bulk of the inhabitants are Papuans, a race resembling the negroes of Guinea. Some are disposed to be friendly, others are fierce and intractable. The discovery of New Guinea was made by the Portuguese early in the sixteenth century, but little was known of it till recently. The naturalists were the first to make incursions into its interior, and among these Mr. A. R. Wallace, who visited it in 1858, was the pioneer. The missionaries came next, and mission stations have been formed by Germans on the north-east coast, and by the London Missionary Society at various points on the south-east coast. Germany and the Australian colonies also began to take an interest in New Guinea and the latter urged the home government to annex the eastern part of the island, the western portion having long been recognized as Dutch. At length the delimitation and division of the island between Great Britain, Germany and Holland was settled in 1885. That part of the island lying west of the 141st meridian is assigned to Holland, and comprises 150,755 square miles; the northern part of the remainder of the island is assigned to Germany, and the southern to Great Britain. The German territory, called Kaiser Wilhelm's Land, contains 68,785 sq. miles; the English territory 86,457 square miles. The islands of Torres Strait, which are the seat of a valuable pearl shell and trepang fishery, and which practically command the strait, have all been annexed to Queensland. A German chartered company whose object is to develop the resources of the country has stations in German New Guinea. The Dutch have done little or nothing for their portion of the island. Pop. estimated at about 200,000.

New Hampshire, one of the United States, bounded on the north by Canada, east by Maine, south-east by the Atlantic, south by Massachusetts, and west by Vermont, from which it is separated by the Connecticut River; area 9341 square miles. This State has a sea coast of only 18 miles. For the distance of 20 or 30 miles from the sea the land is almost level, but thereafter rises, and in its northern part is traversed south-west to northeast by a continuation of the Alleghenies, culminating in Mount Washington, 6293 feet high. There are a number of fine lakes and both lake and mountain scenery is beautiful. The chief mineral resources are granite and mica, though the entire mineral output is small. The principal agricultural industry is dairying; total cattle, 1920 census, 103,653. The farm crops include hay, corn, potatoes, beans, etc. Hay is by far the most valuable product of the farms, and is increasing in value while the farm crops are decreasing. Apple and pear trees are abundant in the cultivated districts; and the hilly and mountainous regions are still covered with extensive forests of pine, oak, beech, birch, sugar-maple, etc. Manufactures are actively carried on, the principal being cotton, woolen and worsted goods, boots and shoes, leather, lumber, iron, machinery, furniture, etc. The mileage of railways is greater in proportion to population and wealth than in any other New England State. Education is well attended to, and there is a university, Dartmouth College, at Hanover. New Hampshire was one of the 13 original States of the Union. It was settled in 1623. The capital is Concord; Manchester is the largest city; the only port is Portsmouth, where there is a navy yard. Pop. (1900) 411,588; (1910) 430,572; (1920) 443,467.

New Haven (hā'vn), a seaport town of Connecticut, capital of New Haven County, on a bay of the same name in Long Island Sound, 72 miles northeast of New York. There are important manufactures of carriages, arms, wire, rubber goods, edge tools, clocks, musical instruments, pulp, paper, etc., and there is a large foreign trade, particularly with the West Indies. New Haven is widely known as the seat of Yale College (which see). Other educational institu-

tions are the Hopkins Grammar School, Boardman Manual Training School, and a State normal school, etc.; there are also several learned societies, including an Academy of Science. Pop. (1900) 108,027; (1910) 133,605; (1920) 162,519.

New Hebrides (heb-ri-dēz), a long chain of volcanic islands in the Pacific, lying northwest of Fiji and northeast of New Caledonia, and embracing an area of about 3000 square miles. They are extremely fertile, producing cocoanuts, sandal wood, fruits, and all manner of Polynesian produce; but the climate is rather unfavorable to Europeans. The natives are of Melanasian race. The New Hebrides have for some time been more or less a source of international difficulty between Britain and France. An agreement was at length come to that neither power should annex the group; but in 1886, apparently in violation of this agreement, French troops were landed on various pretexts, and military stations formed at various points. They eventually evacuated the islands, and a dual protectorate has been formed.

New Holland. See *Australia.*

New Iberia (ī-bē'ri-a), a town of Louisiana, capital of Iberia parish, on the navigable Bayou Teche, 125 miles w. of New Orleans. It ships rice, sugar cane, sugar, and large quantities of salt from the extensive salt mines in the parish. It has pulp and rice mills, canneries, etc. Pop. (1920) 6278.

New Ireland (ir'land) the name of the largest of a group of islands situated east of New Guinea, in the Bismarck Archipelago, in the Pacific Ocean. The inhabitants are cannibal Papuans; the islands are volcanic, and the soil good. Called by the Germans *Neu-Mecklenburg.*

New Jersey (jer'zi), one of the eastern United States, bounded on the north by New York, east by the Atlantic Ocean and the Hudson River, south by Delaware Bay, and west by the States of Delaware and Pennsylvania, from which it is separated by the Delaware River; area, 8224 square miles. The bays of Newark, Raritan and Delaware form excellent harbors. The northwest part of the State is mountainous, being crossed by two ranges of the Appalachian chain. The middle portion of the State is agreeably diversified by hills and valleys; the southern part is level and sandy, and to a great extent barren, yielding naturally little else than scrub-oaks and yellow pine. The other portions of the state have a good soil, and produce Indian corn and other cereals, buckwheat, potatoes, etc. The fruits are good, especially apples, pears, cherries, plums and peaches. The central part of the State is the most thickly settled and is, in fact, a vast market garden for the supply of New York and Philadelphia. Large quantities of grapes and small fruits, including cranberries, are grown in the south. There are large marl deposits, from which the poor soil of the south has been largely fertilized. The climate is mild, and nowhere is the cold severely felt in winter except in the mountainous regions of the north, where the finest cattle are reared, and large quantities of butter and cheese made. The chief minerals are magnetite and brown ores and zinc; and the production of cement and clay products is important. New Jersey ranks high among the States in the fisheries industry and in manufacturing industries, including smelting and refining copper, silk goods, foundry and machine shops, slaughtering and packing, wool goods, wire, leather, electrical machinery, tobacco manufactures and chemicals. Glass is largely produced in the southern portion, where the necessary grade of sand abounds. The principal seat of education is the Princeton University, Princeton, one of the principal colleges in the United States. Other important institutions are Rutgers College, New Brunswick, Stevens Institute of Technology, at Hoboken. The capital is Trenton; the largest city, Newark. Other large cities are Jersey City, Paterson, Camden, Elizabeth, Hoboken. New Jersey was settled by the Dutch, 1614-20. Pop. (1900) 1,883,669; (1910) 2,537,167; (1920) 3,155,900.

New Jerusalem Church. See *Swedenborgians.*

New Kensington, a borough in Westmoreland Co., Pennsylvania, 18 miles N. E. of Pittsburgh. It has aluminum, tin-plate, glass and other factories. Pop. 11,987.

New Leon, or NUEVO LEON, a Mexican state, bounded by Cohahuila, Zacatecas, San Luis Potosi, and Tamaulipas; area, 23,637 square miles. It is mountainous but fertile, and lead, gold, silver and salt are worked; chief town, Monterey. Pop. 270,852.

New London (lun'dun), a city of Connecticut, on the Thames, 3 miles from its entrance into Long Island Sound, 50 miles E. of New Haven; served by the New York, New Haven and Hartford and other railroads. There are important manufacturing industries, including silks, comfortables, cotton gins, printing presses, brass

NEW JERSEY
Scale of Miles
5 10 15 20 25 30
Paterson
Elizabeth
Bayonne
Jersey Cy
Newark
Orange
Morristown
Plainfield
Perth Amboy
New Brunswick
TRENTON
PHILADELPHIA
Camden
Atlantic City
Long Island Sound
New York Lower Bay
Sandy Hook
Long Branch
Seaside Park
Barnegat Inlet
Barnegat City Jc.
Beach Haven
New Inlet
Brigantine
South Atlantic City
Egg Harbor Inlet
Ocean City
Sea Isle City
Avalon
Hereford Inlet
Wildwood
Cape May
Cape May Court House
Delaware Bay
DOVER
Delaware City
Bridgeton
Millville
Vineland
Salem
Pennsville
Pennsgrove
Gibbstown
Woodbury
Clayton
Glassboro
Hammonton
Tuckerton
Manahawken
Barnegat
Lakewood
Point Pleasant
Mantoloking
Bayhead
Manasquan
Spring Lake
Bradley Beach
Asbury Park
Allenhurst
Elberon
Deal Beach
Ocean Grove
Belmar
Sea Isle City
Ocean View
Cape May
Rio Grande
Cold Spring
Hollybeach
Longitude 74°30′ West from Greenwich
ATLANTIC OCEAN
DELAWARE
NEW JERSEY
DELAWARE
BOUNDARY LINE

NEW MEXICO
COLORADO
TEXAS
MEXICO
SANTA FE
Albuquerque
Las Vegas
Roswell
Alamogordo
Lincoln
Socorro
Mesilla
Deming
Silver City
Gallup
Raton
Taos
Mora
Tularosa
Carlsbad
Scale of Miles
0 10 20 30 40 50 60 70 80

and copper tubing, oil and gasoline engines, shipyards, etc. It has a fine harbor and is the chief submarine base of the U. S. The Connecticut College for Women and the U. S. Revenue Cutter Service School of Instruction are here. The city was settled in 1646, and was burned at the hands of Benedict Arnold and the British in 1781. Pop. (1910) 19,659; (1920) 25,688.

Newman (nū'man), FRANCIS WILLIAM, younger brother of Cardinal Newman, was born in London, in 1805, and was educated at Ealing and at Worcester College, Oxford, graduating double first (1826). He was fellow of Balliol 1826-30, when he resigned, having conscientious scruples about signing the *Thirty-nine Articles*. He was appointed classical tutor at Bristol College (1834), professor of classics at Manchester New College (1840), and professor of Latin at University College, London, 1846-63, and from that time he devoted himself exclusively to literature. His writings exhibit great scholarship and versatility. Among them are *The Soul, Its Sorrows and Aspirations* (1849); *Phases of Faith* (1850), and *Theism* (1858). Like his brother, Cardinal Newman, he diverged widely from Anglican orthodoxy, but in precisely the opposite direction. He died in 1897.

Newman, JOHN HENRY, CARDINAL, born at London in 1801, and educated at Ealing and Trinity College, Oxford, where he was graduated with classical honors (1820), and was elected fellow of Oriel College. He was vice-principal of St. Alban's Hall (1825-26) under Dr. (afterwards Archbishop) Whately, and was incumbent of St. Mary's, Oxford, and chaplain of Littlemore (1828-43). During this last period he took part with Keble and Pusey in originating the Oxford movement; was a leader in the propaganda of High Church doctrines, and contributed largely to the celebrated *Tracts for the Times*. The last of these, on the elasticity of the *Thirty-nine Articles*, was censured by the University authorities, and was followed by Newman's resignation of his livings (1843), and secession to the Church of Rome (1845). Ordained a priest of that church, he was successively head of the Oratory of St. Philip Neri at Birmingham, rector of the Roman Catholic University of Dublin (1854-58), and principal of the Roman Catholic School at Edgbaston. In 1879 he was created a cardinal. He produced some remarkable works sustaining the doctrines of the Church of Rome, particularly the *Apologia pro Vitâ suâ* (1864), and the *Reply to Mr. Gladstone* (1875) on the Vatican decrees. He died in 1890.

Newmarket (nū'-mar-ket), a town of England, partly in Cambridgeshire and partly in Suffolk, 13 miles E. N. E. of Cambridge; the chief seat of the Jockey Club, famed for its racecourse, races, and horse-training establishments. The chief races are the Two Thousand, run in April, and the Cesarewitch run in October. Pop. 10,483.

New Mexico (nū-meks'i-kō), one of the United States, bounded on the north by Colorado, east by Texas, south by Texas and Mexico, and west by Arizona; area, 122,634 square miles. The surface is generally mountainous, being traversed from north to south by the Rocky Mountains. A central valley extends across the whole territory from north to south, with an average breadth of 20 miles, traversed by the Rio Grande, and hemmed in either by the main chain or by ramifications of the Rocky Mountains. To the south of the town of Santa Fé these average from 6000 to 8000 feet high, but in the vicinity of the town and north of it some snowy peaks rise to the height of 20,000 or 12,000 feet. The higher ranges are covered in many places with pine forests, and the lower with cedars and occasional oaks. The soil is often sandy and the rainfall is small, but irrigation has been practiced in the Rio Grande Valley and other parts of New Mexico for centuries as the extensive remains of pre-historic irrigation works testify. The Pecos Valley, which is generally considered that part of the Pecos Valley in the vicinity of Roswell, Artesia, and Carlsbad, all in New Mexico, is now likewise under irrigation. The climate is dry and healthful. Agriculture is rapidly increasing, wheat, oats, corn, beans, onions, cabbage and hay being among the chief crops, while many fruits, especially apples and grapes are grown. The mesas or table lands, occupy a large part of the surface, making stock raising and wool growing the leading occupations. Minerals occur in abundance, there being enormous deposits of coal, part of it anthracite. Gold, silver, iron, copper, lead and petroleum are all being worked, the gold product annually increasing. Large mica mines are worked, and there are various minerals of importance. New Mexico was ceded by Mexico to the United States in 1848, as a result of the Mexican war. It was created in 1850 into a territory of much more than its present extent, Arizona being cut off from it in 1863 and another portion added to Colorado in 1865. It was admitted to the Union as a state by act of Congress in 1910, subject to the

approval of its constitution by the President, which was given in January, 1912. The State University is at Albuquerque. At Socorro is the State School of Mines, and at State College is the College of Agriculture and Mechanic Arts. Capital, Santa Fé. Pop. (1900) 195,310; (1910) 327,301; (1920) 360,350.

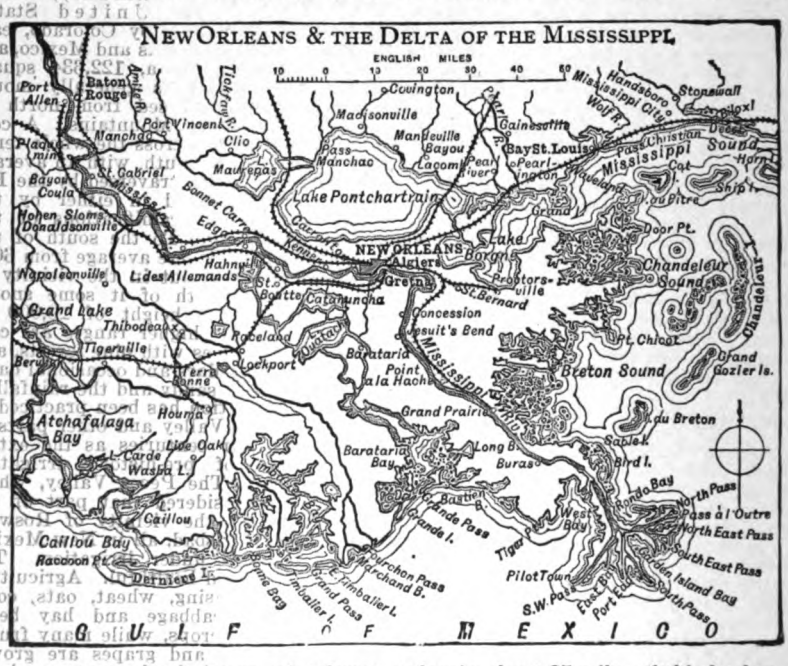
New Milford, a town of Litchfield Co., Connecticut, on the Housatonic River, 14 miles N. of Danbury. It has manufactures of tobacco, hats, lime, paint, cold rolled steel, silverware, etc. Pop. (1920) 4781.

Newnan (nū'nan), a city, county seat of Coweta Co., Georgia, 40 miles S. S. W. of Atlanta. It has large engine and boiler works, cotton and oil mills, fertilizer works, etc. Pop. 7037.

New Netherland, the name given to the territory of the Dutch West India Company (q. v.) in America in 1630. When the English took possession it was named New York, in honor of the Duke of York, who was given a grant of the territory. The island of Manhattan was called New Amsterdam.

Newnham College (nūn'am), an English college for the higher education of women, at Cambridge, founded in 1871.

New Orleans (nū-or'lē-anz), a city and port of Louisiana, chiefly on the east bank of the Mississippi, 110 miles from the Gulf of Mexico. It has a harbor extending from the jetties at the mouth of the river to Baton Rouge: 257 miles in length, averaging three-fourths of a mile wide, and from 36 to 234 feet in depth. The Port of New Orleans



takes in about 25 miles of this harbor. It has 41 miles of river frontage on both banks, with great wharves, steel sheds, warehouses and elevators. Waterways connect it with lakes and bayous on all sides. Its railroad facilities are supplied by ten trunk lines, a Public Belt Railroad and other lines. It has dry docks, including the U. S. Naval Station Dry Docks, and iron works and shipbuilding yards. The city lies below the level of high water, and is protected from overflows by *levees* or embankments. The nucleus of the city was built around a bend in the river; hence its popular name, 'the Crescent City.' The streets in this portion are mostly narrow, but many of those in the suburbs are spacious and handsome, and

lined with shade trees. The educational institutions include Tulane University, the Ursuline convent, Loyola University, and others. Its Carnival celebrations are world-renowned and attract thousands of visitors. New Orleans is the most important commercial city in the South and the largest cotton market in the world, with the exception of Liverpool. It has steamship connection with world ports, and ships sugar, molasses, rice, tobacco, grain, flour, and above all, cotton. It has hundreds of great manufacturing plants. Founded in 1717, it was transferred to the United States in 1803. Pop. (1900) 287,104; (1910) 339,075; (1920) 387,219.

New Philadelphia, a city, county seat of Tuscarawas Co., Ohio, on Tuscarawas River and Ohio Canal. It has steel mills, etc. Pop. (1920) 10,718.

New Platonists (plā'tō-nists), a philosophical sect, so called because they founded their speculations on those of Plato; also called the *Alexandrian Platonists*, because their chief seat was at first in Alexandria. Their doctrines (Neoplatonism) had a tendency to unite Platonic ideas with Oriental mysticism, and borrowed elements from various schools. Ammonius Saccas of Alexandria was the founder of the school, and among his pupils were Longinus, Plotinus and Origen, Plotinus (born A.D. 205; died 270) being the chief and the one who contributed chiefly to settle the doctrines of New Platonism. Philosophy, according to him, should know the One which is the cause and essence of all things, the original of primitive light from which everything emanates, not by thought and reflection, but in a perfect manner by intuition, which precedes thought. Intelligence, the product and image of the One, penetrates all things; and the soul proceeds from it, as the forming thought; the soul again seeks the One, the Good, the original cause of the universe. The whole spiritual world is to be considered as one spiritual being. The sensible world is but the image of the intelligible world; time is an image of eternity, and emanates from it. Evil is either only apparent or necessary; but if necessary, it ceases to be evil. The god of Plotinus is a mystical Trinity, consisting of three Hypostases or Substances. Among the pupils of Plotinus, Porphyry and Iamblichus were the most distinguished. Athens became the seat of New Platonism, also called Neoplatonism.

New Plymouth (plim'uth), a town of New Zealand, in the North Island, capital of the province of Taranaki, beautifully situated on the west coast, 120 miles from Auckland. Pop. (1906) 5141.

Newport (nū'port), a municipal borough of England, in the Isle of Wight, on the Medina, which is navigable for small craft. About a mile from the town are the ruins of Carisbrooke Castle. Newport sent two members to Parliament from the reign of Elizabeth till 1867, and later, one. Pop. 11,155.

Newport, a seaport of England, in Monmouthshire, on the river Usk, 12 miles northeast of Cardiff by rail. The docks are spacious, and capable of admitting vessels of any dimensions and burden at all states of the tides. The great trade of the place is the export of manufactured iron. Shipbuilding is carried on to some extent. There are also iron foundries, sail lofts, anchor and chain cable works, etc. Pop. 83,700.

Newport, a city of Kentucky, on the Ohio River, opposite Cincinnati, of which it is practically a residential suburb. It has lithographing plants, book-machinery plant, iron and steel manufactures, etc. Pop. (1910) 30,309; (1920) 29,317.

Newport, a seaport and formerly one of the capitals of Rhode Island, now county seat of Newport County, at the entrance of Narragansett Bay, 25 miles S. by E. of Providence. It has a splendid harbor, easy of access, deep enough for the largest ships, and defended by several forts. Newport is the most fashionable watering place in the United States, many wealthy citizens having palatial residences here. The winter climate is mild. Pop. (1920) 30,255.

Newport News, a seaport in Warwick Co., Virginia, near the extremity of the peninsula formed by the York and James rivers. It has extensive shipbuilding yards, large wharves and elevators, dry-docks, foundries, machine works, lumber plants, broom factories, canning factories, bottling works, etc. It has the finest natural harbor on the Atlantic coast and is one of the principal ports of the United States. Numerous steamship lines carry on an extensive trade with this port, and it has the world's greatest steel coal pier. Pop. (1910) 20,205; (1920) 35,596.

New Providence. See *Bahama Islands.*

New Red Sandstone, the lowest group of secondary rocks, lying between the Permian below and the Lias above. See *Geology.*

New Rochelle (rō'shel), a city of Westchester county,

New York, on Long Island Sound, 16½ miles N. E. of New York City, of which it is a residence town. It has many beautiful villas and a factory of druggists' scales. It was founded by Huguenot refugees from France in 1687. Pop. 36,213.

New Ross, a river port of Ireland, on the Barrow, 2 miles below its juncture with Nore, situated in Wexford county, 102 miles by rail S. S. W. of Dublin.

Newry (nū-ri), a parliamentary borough of Ireland in county Down, situated on the Newry at the extreme head of Carlingford Lough, 38 miles S. S. W. of Belfast. It is a handsome, well-built town, and has flour mills and large spinning mills. Newry exports large quantities of cattle and agricultural produce to Liverpool and Glasgow. Pop. 11,956.

New Shetland (shet'land), a group of islands almost destitute of vegetation, in the Antarctic Ocean, about 500 miles S. E. of Cape Horn. They were discovered in 1819, and are sometimes visited by whalers.

New Siberia (si-bē'ri-a), a group of uninhabited islands in the Arctic Ocean, off the north coast of Siberia; area estimated at 9650 square miles. The islands produce neither bush nor tree, but the soil contains much fossil wealth in the shape of mammoth ivory, many of these great animals having left their remains in the island soil.

New South Wales, a state of the Commonwealth of Australia, bounded by Queensland on the N., Victoria on the S., the Pacific Ocean on the E., and South Australia on the W.; area, 310,372 square miles. In order to provide a site for the new federal capital, Canberra, territory of about 900 square miles, was acquired from New South Wales in 1910.

The chief physical feature of the state is a mountain chain (the Great Dividing Range), which extends from north to south nearly parallel to the coast at the distance of from 30 to 140 miles inland. The highest summits are Mount Kosciusko and Mount Townshend in the southeast, Kosciusko (7328 feet) being the highest mountain in the colony, and in Australia. The coast line presents in general bold perpendicular cliffs of sandstone in horizontal strata, and has many indentures serving as ports. The most important rivers are on the west side of the great watershed, the chief being the Murray, the Murrumbidgee, the Lachlan and the Darling, the Murray receiving the waters of the others and carrying them to the sea through S. Australia. The Murray partly belongs also to Victoria, as it forms the boundary between the two states, and the Darling is therefore the most important river of New South Wales. The volume of the rivers depends greatly on the season, and their utility for inland navigation is much impaired by their shallowness. As a general rule the prevailing rock on the east side of the mountain is sandstone, and on the west granite. Much of the sandstone belongs to the Carboniferous system and is accompanied with workable seams of excellent coal. Copper ore of the richest quality has been found in great abundance. Tin exists in large quantities, and iron is very generally distributed. But the chief mineral product of the state har been gold, the total value of which hitherto obtained amounts to about $300,000,000. Silver and lead have also been found. As the area of the state extends over eleven degrees of latitude, and as it contains a good deal of elevated ground, nearly every variety of climate is to be found. The interior plains are very dry, while the coast districts have abundant rains. The winters are mild; and though the hot winds of the warm season are annoying, they are not unhealthy, while storms and electrical disturbances are comparatively rare. The scarcity of water renders much of the surface far better adapted for pasturage than for agricultural purposes, though where the necessary moisture is present heavy crops are obtained. The agricultural land is chiefly under wheat and maize, oats and barley, and there is also a considerable area under sugar, vines, fruit trees, etc. Fruits and vegetables in great variety are grown. But the rearing of sheep and cattle is the chief employment of the people, and wool is the most important article of export. There are about 40,000,000 sheep in the state. The exports include wool, gold coin, tin, sheep, cattle, tallow, coal, copper, etc. The imports are wearing apparel, iron goods and hardware, wine, spirits, and beer, sugar and tea, etc. The industrial works embrace tanneries, woolen factories, soap and candle works, breweries, steam sawmills, shipyards, foundries, machine works, clothing factories, etc.

Sydney is the capital; other towns are Balmain, Broken Hill, Glebe, Leichhardt, Merrickville, Newtown, Paddington and Redfern. New South Wales was discovered by Captain Cook in 1770, and founded as a penal settlement (at Botany Bay) in 1788. The most important events in its history since convict immigration ceased in 1840 are the establishment of representative institutions in 1843; the erection of Victoria into a separate colony in

1850; the important discovery in May, 1851, of extensive auriferous tracts and the rush to the gold mines with consequent great increase in population and prosperity. The state government consists of two houses: the Legislative Council, appointed by the crown; and the Legislative Assembly, elected by the people. Women have voted since 1904. New South Wales sends 27 members to the federal House of Representatives. Pop. in 1911, 1,650.000. See *Australia*.

Newspaper (nūz'pā-per), a periodical publication containing the news. Although something like an official newspaper or government gazette existed in ancient Rome, and Venice in the middle of the sixteenth century had also official news sheets, the first regular newspaper was published at Frankfort in 1615. In England no genuine newspaper of the sixteenth century has been preserved, and it is not till 1622 that we find *The Weekly News from Italy, Germany*, etc., which may be regarded as the first specimen of the regular newspaper that appeared in England. Other journals followed, and one of these, published in November, 1641, under the title of *Diurnal Occurrences, or the Heads of Several Proceedings in Both Houses of Parliament*, is noticeable as the first which furnished a report of the proceedings in Parliament. The oldest existing newspaper in England is the government paper, the *London Gazette*, the first number of which was issued on November 7, 1655, at Oxford, whither the court had retired in consequence of the plague then raging in London. It has since been uninterruptedly published twice a week for more than two centuries. The first London daily paper was published in 1709 under the name of the *Daily Courant*. Among the journals of the eighteenth century may be noticed more especially the *Public Advertiser*, which first appeared in 1726, and became afterwards so celebrated by the publication in it of the famous *Letters of Junius*. The *Morning Chronicle* appeared in 1769, and the *Morning Post* in 1772. The latter is still flourishing; the former lasted over ninety years. The *Times* was first commenced on January 18, 1785, under the name of the *London Daily Universal Register*, which was afterwards superseded by that of the *Times* on January 1, 1788. From the establishment of the *Times* scarcely any attempt to start a daily paper in London for a long time succeeded, with the exception of the *Morning Advertiser* (1794). During the nineteenth century large numbers of newspapers were established.

One of the earliest English local papers was the Norwich *Postman*, published in 1706 at the charge of a penny, but 'a half-penny not refused'; and followed by the *Norwich Courant* in 1714, and the *Weekly Mercury*, or *Protestant's Packet* (also at Norwich, and still in existence), in 1720. The *Worcester Postman* appeared in 1708, and the *Leeds Mercury* in 1718.

It is interesting to find that the American colonies were not far behind the mother country in establishing newspapers, and equally interesting to know that the most remarkable development of the newspaper has been in the United States, where, in proportion to population, its growth and influence has been much greater than in any other country. In Colonial times the first newspaper to appear was on September 25, 1690, when Benjamin Harris published, in Boston, *Publick Occurrences, both Foreign and Domestick*, a proposed monthly which, however, never got beyond its first issue, being suppressed by the authorities. In 1696 a reprint of *The London Gazette* was issued in New York. The postmaster at Boston, John Campbell, gathered and distributed the news by means of a circular, which he sent to a few friends and the New England governors. This led on April 24, 1704, to the publication of the *News-Letter*, now recognized as the first newspaper published in America. This was printed on a sheet of foolscap, on one side only. It ceased in 1776. December 21, 1719, appeared *The Boston Gazette;* on the day following *The American Weekly Mercury* made its initial bow in Philadelphia. James Franklin established in Boston, *The New England Courant*, in 1721, and it was on this journal that Benjamin Franklin served as printer's apprentice. This paper was so free and independent that it aroused the people of sleepy Boston, and the proprietor was thrown into jail. Then Benjamin Franklin, at that time (February 11, 1722), only sixteen years of age, took charge as editor and publisher. In October, 1725, *The New York Gazette* appeared, being the first to be published in that province. In succession followed: *The New England Weekly Journal* (1727); *The Maryland Gazette*, the same year; *The Universal Instructor in All the Arts and Sciences and Pennsylvania Gazette* (1728), soon after purchased by Benjamin Franklin, who abbreviated its title to *The Pennsylvania Gazette; The South Carolina Gazette* (1731); *The New York Weekly Journal* (1733); *The Virginia Gazette* (1736). It will appear from this list that the colonies closely rivaled England in

this field of enterprise. Ante-Revolutionary years brought forth a great increase in the number and energy of the press, the restlessness of the country demanding vent and finding it therein. In opposing the Stamp Act of 1765 the patriotic press had an enormous influence in the colonies. At this time all the newspapers were weekly, monthly or published 'every little while.' It was not until 1784 that the first daily appeared, this being *The American Daily Advertiser*, published in Philadelphia by Claypoole, who first introduced reporting on this continent. This was the commencement of the era of newspaperdom as it at present exists in the United States.

Up to 1833 the American newspapers were distributed almost solely by subscription, at a price which at the present time would appear very high, especially in view of the meager news and the small size of the sheets. There were no street sales, no news stands, and but few were retailed at the offices. In 1835 no paper had a circulation of 5000, and very few even half that number. The *Morning Post*, New York, 1833, was the first penny paper; it lived but three weeks.

Benjamin Day issued *The Sun*, September 3, 1833, at one cent per copy. It gained a large circulation, and in 1867 came under the direction of Charles A. Dana, being then published at two cents. About two years later James Gordon Bennett established *The New York Herald*, which became a power in the land. At a later period, with *The London Telegraph*, it equipped an expedition in search of Livingstone, the famous African explorer and missionary. The *New York Tribune* was founded by Horace Greeley on April 10, 1841; at its outset this was a penny paper. It also, soon after commencing, issued weekly and semiweekly editions. In September, 1851, *The New York Times* was established by H. J. Raymond. June 1, 1860, *The New York World* was started by a number of persons as a newspaper which should contain no police reports, theatrical notices or debasing advertisements. Since these dates the sizes of American newspapers have very greatly increased, the cost of publication having similarly augmented, so that the circulation must necessarily be great and the advertising receipts immense to repay such cost.

We have so far named only the early New York newspaper enterprises, but the great distances in America, the excellent telegraph service, and the aid of the several press associations have stimulated the growth of first-class newspapers in every large city and Philadelphia, Chicago, Boston, Cincinnati, St. Louis, New Orleans, San Francisco, Baltimore and other large cities have long possessed strong, enterprising and reliable journals, equaling or exceeding those of New York, in expenditure, circulation and influence. In this class are *The Public Ledger*, *Record*, *Telegraph*, *Press*, *North American*, *Inquirer* and *Bulletin*, in Philadelphia; in Chicago, the *Tribune*, *Herald*, *Inter Ocean*, *News*, *Times*, etc.; in St. Louis, *The Globe-Democrat* and *Republic;* in Baltimore, *The Sun* and *Herald;* in Cincinnati, *The Commercial Gazette* and *Enquirer;* in New Orleans, *The Times-Democrat* and *Picayune;* in San Francisco, the *Chronicle*, *Examiner*, *Bulletin* and *Call;* in Boston, the *Globe*, *Post* and *Herald*. Beside this nearly every town and county in the United States has one or more daily or weekly newspapers. The first illustrated daily was *The Daily Graphic*, but it proved too expensive, and died in 1888, after a few years' precarious existence. Since then the illustrating of the dailies has become a common feature. Every trade, organization, profession and science now has its representative journal or journals, there are numerous weeklies of literary character, or devoted to science, art, religious or other fields of thought, and Solomon's remark might be paraphrased to read: 'To the making of newspapers there is no end.' The great and rapid presses of recent years, the methods of mechanical type-setting, and the cheapness and excellence of photographic illustrations, have been necessary elements of the great sheets and enormous circulations of the present day, and the twentieth century newspaper is one of the greatest achievements in the whole field of human enterprise.

New Style. See *Calendar*.

Newt (nūt), or EFT, the popular name applied to various genera of amphibians included in the order Urodela ('tailed') of that class. Water-newts, or 'water-salamanders' as they are sometimes termed, possess a compressed tail, adapted for swimming. These forms are oviparous, and though aquatic in their habits they are yet strict air-breathers. The larval gills are cast off on maturity being reached, or about the third month of existence. The larval tail is retained throughout life. The male animals are distinguished by the possession of a crest or fleshy ridge bone on the back. The food consists chiefly of aquatic insects, larvæ, etc. The *Triton cristatus*, or great water-newt, is about

6 inches in length; the *Triton aquaticus* averages about 3 inches; and both are common in fresh water pools and ponds in Britain. The land-newts are included under the genus *Salamandra*. The tail is of rounded or cylindrical form, and is

Great Water-newt (*Triton cristatus*).

therefore not adapted for swimming. The land-newts possess cutaneous glands which secrete a fluid of watery nature; and the popular superstition that if put on a fire these creatures were able to extinguish the flames may have taken origin from the abundant secretion of these glands. *Salamandra maculōsa* of Southern Europe is a familiar species, as also is the *S. alpina* found inhabiting mountainous situations. These forms possess the power of reproducing lost or mutilated toes or even limbs. The newt is quite harmless.

New Testament. See *Bible*.

New Thought, an idealistic system of thought that came into prominence in the latter part of the nineteenth century. It is a direct descendant of New England transcendentalism, but is more practical, being preached and practiced in the small affairs of everyday life. New Thought professes to heal sickness and to remove the terror of death. It is often confounded with Christian Science, but differs from that belief in asserting the *reality* of the world, considering it as an expression of God. The central doctrines of New Thought lie in psychology. It maintains the supremacy of mind over all matter, and identifies it with the perennial stream of energy which permeates existence. The ego is considered as identical with the Supreme Mind, and as capable of erecting conditions and environment; it keeps itself alive in love, law and order by constant affirmation of self.

Newton (nū'tun), a city, county seat of Harvey County, 27 miles N. of Wichita in a rich agricultural section, on the Missouri Pacific and Santa Fé railroads. It is the seat of Bethel College, and has flour mills, creameries, ice plants, wholesale floral establishments, overall and work shirt factories, grain separators, etc. Pop. (1920) 9781.

Newton, a city, county seat of Jasper Co., Iowa, 35 miles E. by N. of Des Moines. It has foundry, machine-shops, and manufactures automobile accessories, gas engines, flour, machinery, etc. Pop. (1920) 6627.

Newton, a city of Middlesex Co., Massachusetts, adjoining Boston on the S. W., and a favorite place of residence for Boston merchants. It is the seat of a Baptist theological institute, and the Lasell Seminary for women, and has numerous manufactures, embracing cotton, worsteds, hosiery, machinery, starch, paper, silk, and other products. Pop. (1910) 39,806; (1920) 46,054.

Newton, Hubert Anson (1830-96), an American mathematician, born at Sherburne, N. Y., graduate from Yale in 1850; professor of mathematics there from 1856. He became notable for his researches and discoveries regarding the laws governing comets and meteors and

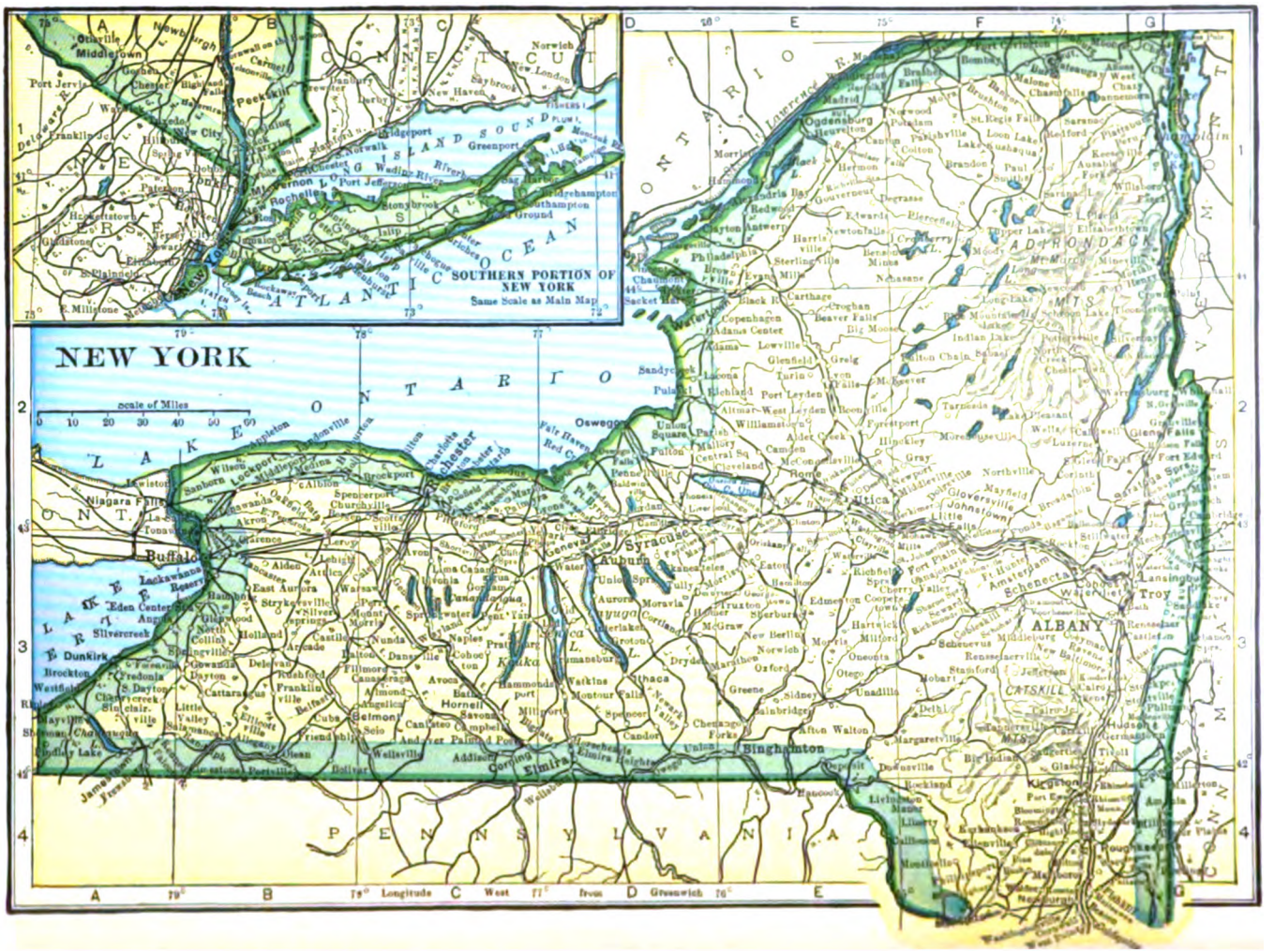
Newton, Sir Isaac, the most distinguished mathematician of modern times, was born at Woolsthorpe, Lincolnshire, in 1642, being the son of Isaac Newton, farmer and proprietor of the manor of Woolsthorpe. He was sent at an early age to the village school, and in his twelfth year to the town of Grantham, where he remained till he was entered at Trinity College, Cambridge, in 1660. In 1663-64 he discovered the formula known as *Newton's Binomial Theorem* (see Binomial); and before 1665 he had established his doctrine of fluxions. Some years later Leibnitz also discovered this invaluable method, and presented it to the world in a different form —that of the differential calculus. About this time (1665), being obliged to quit Cambridge on account of the plague, he retired to Woolsthorpe, where the idea of universal gravitation is said to have first presented itself to him, from observing the fall of an apple in his garden. This, however, is legendary and without foundation in fact. In 1666 he returned to Cambridge, was chosen fellow for his college (Trinity College) in 1667, and the next year was admitted A. M. By this time his attention had been drawn to the phenomena of the refraction of light through prisms, and to the improvement of telescopes. His experiments led him to conclude that light is not a simple homogeneous substance, but that it is composed of a number of rays of unequal refrangibility, and possessing different colors. In 1669, being appointed profes-

sor of mathematics at Cambridge, and preparing to lecture on optics, he endeavored to mature his first results, and composed a treatise on the subject. In 1672 Newton was chosen a fellow of the Royal Society, to which he communicated a description of a new arrangement for reflecting telescopes, which rendered them more convenient by diminishing their length without weakening their magnifying powers; and soon after, the first part of his labors on the analysis of light. This led him into controversies with Hooke, Huygens, and several eminent foreigners, Newton maintaining the corpuscular theory, now generally given up in favor of the undulatory theory. In 1675 he addressed another paper to the Royal Society, completing the account of his results and of his views on the nature of light. This treatise, united with his first paper on the analysis of light, afterwards served as the base of the great work, *Treatise on Optics* (1704). He had before this deduced from the laws of Kepler the important law that gravity decreased with the square of the distance, a law to which Sir Christopher Wren, Halley and Hooke had all been led by independent study. No demonstration of it, however, had been given, and no proof obtained that the same power which causes subjects to fall to the earth was that which retained the moon and other planets in their orbits. Adopting the ordinary measure of the earth's radius, Newton had been led to the conclusion that the force which kept the moon in her orbit, if the same as gravity, was one-sixth greater than that which is actually observed, a result which perplexed him, and prevented him from communicating to his friends the great speculation in which he was engaged. In June, 1682, however, he had heard of Picard's more accurate measure of the earth's diameter, and repeating with this measure his former calculations, he found, to his extreme delight, that the force of gravity, by which bodies fall at the earth's surface, 4000 miles from the earth's center, when diminished as the square of 240,000 miles, the moon's distance, was almost exactly equal to that which kept the moon in her orbit. Hence it followed that the same power retained all the other satellites round their primaries and all the primaries round the sun. Two years were spent in penetrating the consequences of this discovery, and in preparing his immortal work, *Philosophiæ Naturalis Principia Mathematica*, commonly called 'Newton's Principia,' which was printed in 1687 at the expense of Dr. Halley. In 1687 Newton was one of the delegates sent by the University of Cambridge to maintain its rights before the High Commission Court when they were attacked by James II, and in 1688 he was elected by the university to the Convention Parliament. In 1696 he was appointed warden of the mint, and in 1699 master. In 1701 he was again returned to parliament by his university; in 1703 he was chosen president of the Royal Society; and in 1705 was knighted by Queen Anne. In his later years he took great interest in chemistry and in the elucidation of the sacred Scriptures. His health was good until his eightieth year, when he suffered from a calculous disorder, which occasioned his death in 1727. He was interred in Westminster Abbey. The most important of Newton's philosophical works are his *Principia;* his *Arithmetica Universalis;* his *Geometria Analytica;* and his *Treatise on Optics.*

Newton, JOHN, an English divine, born in London in 1725; died there in 1807. When eleven years old he was taken to sea by his father, then master of a ship in the Mediterranean trade. His subsequent life was of a rather irregular description until his thirtieth year, when he resolved to qualify himself for holy orders. He was ordained to the curacy of Olney, in Buckinghamshire, in 1764. During his incumbency at Olney he became acquainted with the poet Cowper, who contributed sixty-eight hymns to the collection published by Newton in 1776, and known as the *Olney Hymns.* In 1779 Newton was presented to the living of the united parishes of St. Mary Woolnoth and St. Mary Woolchurch Haw, London, and held it till his death. His best-known works are his *Autobiography* (1764), a *Review of Ecclesiastical History* (1770), and the *Olney Hymns.*

Newton, JOHN, soldier, was born in Virginia in 1823. He was graduated from West Point in 1842, and followed the career of a military and civil engineer. He served with great distinction during the war for the Union, after which he was employed in strengthening New York harbor. It was he who planned and carried out (1876) the removal of the Hell Gate obstruction to navigation in the East River. He was made brigadier-general in 1884 and retired in 1886. In 1887-88 he was Commissioner of Public Works of New York, and in the latter year became president of the Panama railroad. He died in 1895.

Newton-in-Makerfield, or NEWTON-LE-


NEW YORK
SOUTHERN PORTION OF NEW YORK
Same Scale as Main Map
scale of Miles
0 10 20 30 40 50
ONTARIO
LAKE ONTARIO
ATLANTIC OCEAN
PENNSYLVANIA
CONNECTICUT
ADIRONDACK MTS.
CATSKILL MTS.
ALBANY
Buffalo
Syracuse
Rochester
Utica
Binghamton
Elmira
Troy
Oswego
Auburn
Ithaca
Niagara Falls
Dunkirk
Peekskill
Poughkeepsie
Newburgh
Middletown
Port Jervis
Hudson
Schenectady
Amsterdam
Lansingburgh
Saratoga Springs
Glens Falls
Plattsburgh
Ogdensburg
Watertown
Lake Champlain
Lake George
Long Island Sound
Fishers I.
Block I.
Montauk Pt.
Southampton
Greenport
Sag Harbor
Port Jefferson
Stonybrook
Riverhead
Patchogue
Bridgeport
Norwalk
Stamford
Greenwich
New Haven
Saybrook
New London
Norwich
Hartford
Delaware R.
Hudson R.
Mohawk R.
Genesee R.
Susquehanna R.
Chemung R.
Cayuga L.
Seneca L.
Owasco L.
Otisville
Middletown
Port Jervis
Chester
Goshen
Monroe
Warwick
Greenwood L.
Oyster Bay
Hempstead
Jamaica
Flushing
Brooklyn
Staten I.
Newark
Paterson
Hackensack
Jersey City
Elizabeth
Perth Amboy
New City
Suffern
Ramapo
Tappan
Nyack
Yonkers
Mt. Vernon
New Rochelle
Port Chester
Rye
Stamford
Greenwich
Norwalk
Bridgeport
Stratford
Milford
New Haven
Saybrook
New London
Norwich
Hartford
Meriden
Waterbury
Danbury
Ridgefield
Redding
Westport
Fairfield
Bridgeport
Stratford
Milford
Derby
Ansonia
Seymour
Naugatuck
Waterbury
Torrington
Winsted
Litchfield
Canaan
Salisbury
Kent
New Milford
Sharon
Lakeville
Salisbury
Canaan
Norfolk
Winsted
Torrington
Goshen
Litchfield
Morris
Bantam L.
Lake Waramaug
Lake Candlewood
Housatonic R.
Connecticut R.
Thames R.
Quinebaug R.
Shetucket R.
Willimantic R.
Windham
Willimantic
Putnam
Thompson
Killingly
Danielson
Plainfield
Norwich
New London
Groton
Stonington
Mystic
Watch Hill
Block I.
Fishers I.
Montauk Pt.
Southampton
Greenport
Sag Harbor
Port Jefferson
Stonybrook
Riverhead
Patchogue
Bridgeport
Norwalk
Stamford
Greenwich

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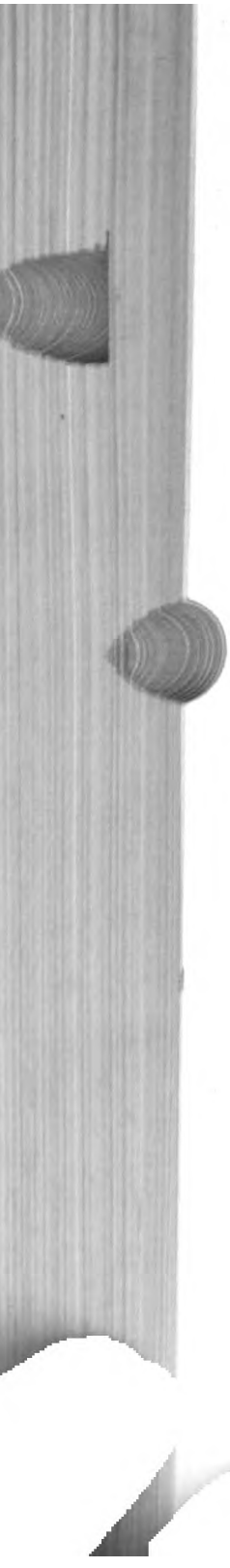
THE WORLD-FAMOUS SKYLINE OF NEW YORK

Over two millions of people live on the narrow island of Manhattan, which forms a borough of New York City; and many more millions fill its canyons and office buildings during the working hours. The only room for growth was upward, and this photograph gives some idea of how man has climbed into the skies. The enormously tall buildings which form the 'skyscraper' district of New York, and which have become a distinctive feature of American cities, have no rival in the world. The great tower of the Woolworth building is at the extreme right of the picture; in the center is the graceful tower of the Singer building.



WILLOWS, a town of England, in Lancashire, 15 miles east by north of Liverpool. The manufactures include paper works, glass works, a large iron foundry, and a sugar refinery, besides an establishment for the manufacture of trucks for the London & North-Western Railway. Pop. 18,462.

Newton's Laws of Motion.

See *Dynamics*.

Newtown (nū'toun), a borough and market town of North Wales, County Montgomery, on the Severn. It has an ancient church (now in ruins) in the early English style. It is the chief seat of the Welsh flannel manufacture, which, however, is now falling off considerably, and being superseded by the manufacture of tweeds, shawls, etc. Pop. 5929.

Newtown, a town of New South Wales, forming a suburb of Sydney, but under distinct municipal government since 1862. It is connected with the city by railroad. With Sydney merchants it is much in favor as a place of residence. Pop. 26,500.

Newtownards (nū-toun-ârdz'), a town of Ireland, County Down, at the north extremity of Lough Strangford, 9 miles east of Belfast. It consists chiefly of a handsome square, and several streets leading into it. Pop. 10,000.

New Ulm, a city, capital of Brown Co., Minnesota, on the Minnesota River, 88 miles S. W. of Minneapolis. It has manufactures of organs, woolens, flour, sash, doors, concrete blocks, etc. Pop. (1920) 6745.

New Westminster (west' minstèr), a city of British Columbia, on the Fraser River, about 15 miles from its mouth, and near the western terminus of the Canadian Pacific Railway, and also connected by a short line with the United States railway system. It is the headquarters of the foreign and river traffic of the province. Chief industry, salmon canning. Pop. (1911) 13,199.

New Whatcom (hwot'kun), a former city and capital of Whatcom County, Washington, on E. shore of Bellingham Bay, 73 miles N. of Seattle, and on the Great Northern and Northern Pacific railroads. It has large fishing and canning interests, ships hops, coal and lumber, and has woodworking factories, machine shops, etc. Pop. in 1900, 6834. Since the date of this census, New Whatcom has united with Fairhaven, etc., to form the present city of Bellingham.

New Year's Day, the first day of the year from the earliest times observed with religious ceremonies or festive rejoicing. New Year's Day, being the eighth day after Christmas, is the festival of Christ's circumcision. The day is a holiday, celebrated with religious service all over the European continent, though not generally in Britain nor in the United States.

New York (nū-york'), 'the Empire State,' one of the thirteen original United States of North America, having Canada on the north and northwest, from which it is almost entirely separated by the St. Lawrence, Lake Ontario, the Niagara River and Lake Erie; south, Pennsylvania, New Jersey, and the Atlantic; and east, Connecticut, Massachusetts and Vermont. Long Island belongs to the State, whose seaboard otherwise is very small. Total area, 49,204 square miles. The surface in the southeast is traversed by several mountain ranges from New Jersey, one of which, crossing the Hudson, presents a bold and lofty front on both banks, and forms magnificent scenery. The Catskill Mountains have the greatest average height, and in Round Top attain 3800 feet; but the culminating point is Mount Marcy, which belongs to the Adirondack group, and has a height of 5467 feet. In the west the large tract extending between Lake Ontario on the north and Pennsylvania on the south is generally level. The principal rivers are the Hudson, Delaware, Susquehanna, Mohawk, Oswego, Genesee, Niagara, Allegheny and St. Lawrence. The falls of Niagara partly belong to the State. Besides the frontier lakes Ontario and Erie, there are many lakes of very considerable size, such as Lakes Champlain, George, Oneida, Cayuga, Seneca, etc. The climate is somewhat variable, but with some local exceptions very healthy. The greater part of the soil is arable, and some of it extremely fertile, and New York occupies a foremost place in agriculture. The largest crops are oats, corn and potatoes, also wheat, barley, hops and grapes, and other fruits. The mountain districts are mainly good grazing land and much attention is paid to the rearing of stock, both for feeding and for dairy purposes, more milk being produced than in all other states of the Union combined, and more butter and cheese than in any other state. The forest trees present a great variety, but the forest area, which used to include nearly half the State, has been much reduced of late years. The lake and ocean fisheries are of great value,

an important part of them being the utilising of fish for oil and fertilizers. The most important mineral is iron. Lead ore is also found, and a vast amount of salt is made from the salt springs. Granite, marbles, sandstones, limestones, clay, sand, and all building materials are abundant. The mineral springs of Saratoga are the most celebrated in America. The manufactures surpass in value those of any other State. The foreign and internal trade are of great importance. The latter is carried on chiefly by canals and railroads in conjunction with the Hudson. Of the canals the most important are the Erie Canal and the more recent State Barge Canal. (See *Erie Canal.*) The length of railways is over 8400 miles. For the higher branches of education ample provision has been made, there being some thirty universities and colleges, and primary education is free. Albany is the capital. The territory of New York was partially explored in 1609 by Henry Hudson, an English navigator in the service of the Dutch East India Company, and soon after was colonized by the Dutch, who were expelled by the English in 1674. During the war with the French the country was laid almost desolate by the ravages of war and the incursions of Indians. In the Revolutionary war many important events took place in New York territory. The first State constitution was adopted in 1777. Pop. (1890) 5,997,853; (1900) 7,268,894; (1910) 9,113,614; (1920) 9,687,744.

New York, CITY OF, the chief city and seaport of the State of New York and of the United States, and in respect of population and commerce the metropolis of the American continent and the second city of the world. The city is admirably situated at the confluence of the Hudson River from the north, and the East River from the northeast (the latter a prolongation of Long Island Sound), their united waters expanding into New York Bay, which forms a magnificent harbor. The approach from the sea is either by the East River and Long Island Sound, or by the wide channel between Sandy Hook and Long Island, and thence by the Narrows between Staten Island and Long Island. In the bay are several islands, notably Ellis Island, the immigrant station; Hoffman and Swinburne Islands, occupied by quarantine institutions; Governor's Island, headquarters of the military division of the Atlantic; and Bedloe's Island, on which is the world-famous Statue of Liberty (see *Liberty*). The city is now divided into five boroughs: Manhattan, Bronx, Brooklyn, Queens and Richmond (about 330 square miles in all).

The plan upon which the newer part of the old city is laid out consists of parallel *avenues*, 100 feet or more in width, named numerically from *first* to *eleventh*, and running from south to north as far as the northern extremity of Manhattan Island, intersected at right angles by *streets* also numerically named, and crossing the city from east to west. Fifth Avenue (7 miles long, 100 feet wide) is the great central avenue, and all the streets running east from it have the prefix *east*, and those running west the prefix *west*, and the houses are numbered accordingly. Fifth Avenue is *par excellence* the fashionable and aristocratic street. The main business thoroughfare is Broadway (15 miles long and 80 feet wide), which in the activity and variety of its traffic, the elegance of its shops, and the massiveness and grandeur of many of its public and private buildings, is one of the most interesting streets in the world. Madison Avenue, next east of Fifth Avenue, vies with it as a street of costly private houses and beautiful churches. The streets in general are excellently paved, and the cleansing of them is well attended to. They are traversed in all directions by electric surface cars, supplemented by elevated railroads with electric trains giving a speed of 15 miles per hour, and by several great subways of underground railways, which traverse the whole length of Manhattan Island and connect with Brooklyn and Jersey City by tunnels under the East and North, or Hudson, rivers.

The most important of the Hudson River tunnels are those of the Pennsylvania Railroad, crossing the river at Thirty-third Street, Manhattan, and enabling the trains from the south and west to be brought into the heart of New York to the great Pennsylvania terminal at Seventh and Eighth Avenues, between Thirty-first and Thirty-third Streets. The Hudson and Manhattan Company operate tunnels from Jersey City to the Hudson Terminal Building on Cortlandt Street, Manhattan, and from Jersey City to Christopher Street, the latter tunnels continuing up Sixth Avenue to Thirty-third Street. From the Pennsylvania terminal, tunnels run east under Thirty-second Street and continue under the East River to Long Island, where connection is made with New England by the new Hell Gate Bridge (*q. v.*). Of the tunnels under the East River, the oldest is the extension of the first subway, passing under the river from the Battery, Manhattan, to Borough Hall, Brooklyn. The Belmont tunnel, crossing from Forty-second Street, Manhattan, to Long Island City, was completed in 1908.

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THE EQUITABLE BUILDING

This building, the largest office building in the world, capable of housing some 15,000 workers, was erected at a cost of $29,000,000. There are 38 stories above ground and three below, giving a floor space of nearly 45 acres.

The Harlem River is crossed by many bridges, some of which carry the trains of the New York Central Railroad, by way of a massive viaduct to the Grand Central Depot on Forty-second Street; others are for the street-car and elevated railroad traffic. The first bridge across the East River (the Brooklyn Bridge; length of river span, 1595 feet) was opened to the public in 1883. The Williamsburg Bridge (total length from Clinton Street, Manhattan, to New Street, Brooklyn, 7308 feet), was opened in 1903. The Queensboro Bridge (total length from Fifty-ninth Street, Manhattan, to Crescent Street, Queens, 7449 feet) was opened in 1909. The Manhattan Bridge (total length, from Bowery, Manhattan, to Brooklyn terminal, 6855 feet) was opened in 1909. Hell Gate Arch Bridge (*q. v.*), spanning the East River at Hell Gate between Ward's Island and Astoria, Long Island, was opened April 1, 1917.

New York has been called the city of cliff dwellers, and with reason, for nowhere else in the world is the apartment house so much in evidence. As many as 200 families are housed in some of these huge buildings, which range from the plainest kind of brick structures to the most elaborate steel and concrete edifices, hundreds of which line the east bank of the Hudson. The city also is unique in its cluster of mammoth business buildings towering up 40 and 50 stories from the narrow tongue of Manhattan Island, presenting, as viewed from the harbor, a skyline that is unparalleled. The Metropolitan Life Building, facing on Madison Square, is over 700 feet high, and is one of the most beautiful of the so-called 'skyscrapers.' The Woolworth Tower, on lower Broadway, probably the tallest business building in the world, is 750 feet in height, with 51 stories. Another striking tower building on Broadway is the Singer Building, 41 stories, 612 feet high. At the junction of Broadway, Fifth Avenue and Twenty-third Street—called the windiest corner in the world—is the well-known Flatiron (Fuller) Building, 20 stories high. Other notable buildings are the Municipal Building, at Park Row and Centre Street, 560 feet high; Bankers' Trust Co., at Wall and Nassau Streets, 539 feet; City Investing Building, on Broadway, 486 feet; Equitable Building, 120 Broadway, 485 feet; the Times, at Broadway and 42d Street, 419 feet; Western Union, 195 Broadway, 403 feet; Heidelberg, Broadway and 42d Street, 410 feet; Pulitzer (World) Building, on Park Row, 375 feet; and the Hudson Terminal Building, on Church Street, 275 feet.

There are nearly a hundred theatres in the four boroughs of New York City. Among these are the Metropolitan Opera House, at 39th Street and Broadway; the Manhattan Opera House, on 34th Street; the old Academy of Music, on 14th Street, which has succumbed to the moving pictures; the Liberty, the Casino, the Globe, the New Amsterdam, the Century, and many others. The Hippodrome, seating 5000 people, is on 6th Avenue at 43d Street. The Winter Garden, seating 1535, is at Broadway and 50th Street. In the Brooklyn borough the new Academy of Music on Lafayette Avenue and St. Felix Street, is the most striking of the theatres.

The hotels include the Waldorf-Astoria at 34th Street and Fifth Avenue; the St. Regis and the Gotham at Fifth Avenue and 55th Street; the Pennsylvania opposite P. R. R. station, 7th Avenue; the Savoy and Plaza at Central Park; the Vanderbilt, the Park Avenue, and the Murray Hill on Park Avenue; the Astor, McAlpin, and a number of others on Broadway; the Ritz-Carlton at Madison Avenue and 46th Street; and the Martha Washington, on Fourth Avenue at 29th Street.

New York is plentifully supplied with concert halls, the best known of which are the Carnegie Hall, at 7th Avenue and 57th Street, with a seating capacity of 2800; and the Aeolian Hall on 43d Street.

There are over 2000 churches in the city. The most notable are Trinity Church, on Broadway, at the head of Wall Street, an immensely wealthy church; old St. Paul's in Trinity Parish, also on Broadway, dating back to the days when that great thoroughfare was a country road; Grace Church, at Broadway and 10th Street; the new Protestant Episcopal Cathedral of St. John the Divine, on Morningside Heights, the building of which was begun in 1885, but will not be completed for many years; St. Patrick's Cathedral (Roman Catholic), on Fifth Avenue at 50th Street, one of the most imposing Gothic edifices in America; the Marble Collegiate Reformed Church on Fifth Avenue at 29th Street; the Jewish Temple Emanu-El at Fifth Avenue at 43d Street; the Brick Presbyterian Church, Fifth Avenue at 37th Street, one of the oldest in the city; old John Street Church, in downtown New York, famous as the cradle of Methodism; Broadway Tabernacle (Congregational) at 56th Street and Broadway; the Christian Science Churches on Central Park West, at 96th and 68th Streets; Fifth Avenue Baptist Church on West 46th Street; St. Paul's Methodist, on 86th Street and West End

Avenue; and the old Unitarian Church of All Souls on Fourth Avenue at 20th Street.

In the city there are many beautiful parks. The oldest and best known is Central Park, situated near the center of Manhattan Island. It is 2½ miles long and a little over half a mile wide, giving an area of 840 acres, which have been converted into a beautiful and much frequented pleasure ground. In the newer section of the city, to the northward, a number of large parks have been laid out (Bronx, Van Cortland, Crotona and Pelham Bay). Prospect Park, Brooklyn, contains 526 acres, and there are many smaller parks, squares and boulevards for public use. Bronx Park contains a large zoölogical garden, and the old Battery, at the southern extremity of Manhattan, contains an attractive aquarium, abundantly supplied with sea and river fishes.

The school system is well developed, and among the institutions for higher education are Columbia University (founded as King's College in 1754); New York University, founded in 1831; the Normal College, for young women; the Cooper Union, and a number of medical, theological, and other educational institutions. There may be named also the Metropolitan Museum of Art, rich in paintings, antiquities, etc.; the American Museum of Natural History, equally rich in its collections; the National Academy of Design, and numerous other scientific, artistic, and other institutions.

The New York Public Library, constructed in 1895 by the union of the Astor, Lenox and Tilden foundations, is seated in a magnificent new building. The New York Free Circulating Library was later added, the total collections numbering considerably more than 1,000,000 volumes. In addition there are numerous other public and private libraries, among the latter being the large library of Columbia University. Among the monuments are statues of Washington, Lincoln, Farragut, Franklin, Shakespere, Burns, Scott, etc., an ancient Egyptian obelisk presented by the Khedive of Egypt; Bartholdi's great statue of Liberty already referred to, and Grant's Tomb. New York is abundantly supplied with theaters, opera houses and other places of amusement, with large hotels, and with many massive and attractive public and municipal buildings, far too numerous to mention here.

Trade, etc.—New York is primarily a commercial city and a center of distribution of domestic and foreign products. The State of New York in 1911 provided a sum of nearly $10,000,000 for the construction of 13 freight terminals for the Barge Canal (Erie) traffic. The industries are rather of a varied character than individually important, the chief being connected with clothing, meat packing, printing and publishing, brewing, etc. Its commerce is enormous, exports and imports, approaching in value $2,000,000,000 annually. Immense numbers of immigrants from Europe arrive here. The water supply is furnished from Croton Lake, an artificial reservoir supplied by Croton River, from which the water is conveyed by an aqueduct of stone masonry of a capacity of over 300,000,000 gallons per day a distance of 40 miles to New York. A larger reservoir, the Ashokan, has been constructed in the Catskill Mountain region, 90 miles north of the city, capable of supplying 500,000,000 gallons a day even in dry years; cost of Catskill system, $180,000,000.

History.—Manhattan Island was first visited in 1609 by Henry Hudson. It was first settled three years after on the southern extremity. The Dutch settlement here formed gradually grew into a town named New Amsterdam, which in 1648 had 1000 inhabitants. In 1664 it surrendered to the British, and took its new name from the Duke of York, into whose hands it came. In 1673 the Dutch regained possession, but lost it finally in the following year. New York was taken from the Americans by the British at the beginning of the war of Independence (August 26, 1776), and held by them till its close (evacuated November 25, 1783). It was the capital of the State of New York from 1784 to 1797, and from 1785 to 1790 it was the seat of the Federal government, and at New York Washington was inaugurated to the presidency in 1789. During the war of 1812-15 its foreign commerce was almost annihilated. The first regular line of packet ships to Liverpool was started in 1817. The opening of the Erie Canal in 1825, later developed into the State Barge Canal, gave the city a preeminent command of internal commerce. Pop. in 1850, 515,547; in 1870, 942,292; in 1880, 1,206,600; in 1890, 1,800,891; (1900) 3,437,202; (1910) 4,766,883; (1920) 5,621,151.

New Zealand (zē'land), a group of islands belonging to Great Britain in the South Pacific Ocean, consisting chiefly of two large islands, called North and South (or Middle) Island, and a third of comparatively insignificant size, Stewart Island; length of the group, north to south, measured on a line curving nearly through their centers, about 1200 miles; area, 105,340

square miles (or 15,000 less than the United Kingdom). Previous to 1876 New Zealand was divided into nine provinces, four in the North Island (Auckland, Taranaki, Wellington and Hawke's Bay) and five in the South Island (Nelson, Marlborough, Canterbury, Otago and Westland); but in 1876 the provinces as such were abolished, though the names are still in common use, and the whole of New Zealand is now divided into 63 counties. Pop. 900,000, including 43,143 Maoris and 2857 Chinese. Capital, Wellington, in North Island; other chief cities: Dunedin, Auckland, Christchurch.

North Island, the most northern of the group, and separated from South Island by Cook's Strait, which, where narrowest, is about 25 miles wide, is very irregular in shape, and much broken by deep bays and projecting headlands. Its area is estimated at 44,736 square miles. It consists of a main body with projections running east, south, and west, and a long narrow projection 280 miles in length, which stretches north with a curve in a westerly direction. The main body of the island, as well as its peninsulas, has for the most part a very rugged and mountainous surface; and besides being traversed from south to north by chains of mountains reaching a height of 6000 feet, presents a number of lofty isolated volcanic peaks, among which the most conspicuous are Tongariro (6500 feet) occasionally active, and Ruapehu (9195 feet) and Mount Egmont (8300 feet), extinct volcanoes. The coast line of North Island contains many excellent natural harbors, especially those of Wellington on Cook's Strait, and of Auckland on the isthmus of the northern projection. The streams are extremely numerous, but are mostly mere torrents, which bring down immense deposits of shingle. The largest of the rivers are the Waikato (200 miles) and the Wanganui (about 120). Most of the streams have their sources in lakes embosomed among mountains covered with magnificent forests, and presenting scenes of extraordinary beauty. The largest of all the lakes is Taupo, situated near the center of the island, about 36 miles long by 25 miles broad. To the northeast occur a number of lakes, familiarly known as the 'Hot Lakes,' there being here hot springs and other volcanic phenomena. In this region there is much remarkable scenery, but the most interesting features, known as the Pink and White Terraces, were destroyed by a volcanic eruption in June, 1886.

South Island is of a much more compact and regular form, and may be considered as a parallelogram; area, about 55,225 square miles. With exception of the north coast, the southwest coast, and a remarkable spur on the east coast called Banks' Peninsula, the coast line is very continuous. On the north coast, from Cape Farewell to Cape Campbell, are numerous good harbors; in the southwest are a series of narrow fiords. South Island is traversed from north to south by a lofty central mountain chain, which has an average height of about 8000 feet; while Mount Cook, near the west coast, the culminating point of New Zealand, is 13,200 feet high. Among these mountains are fields of perpetual snow, and glaciers of great size, stretching down on the southwest to no great distance from the sea. Along the east coast several extensive plains exist. The largest river is the Clutha, which has a course of 150 miles, and enters the sea near the southeast angle of the island. There is some magnificent lake scenery. The largest lakes are Wakatipu and Te Anau, covering 114 and 132 square miles respectively. *Stewart Island* is separated from South Island by Foveaux Strait, about 15 miles wide. It is of a triangular form, with an area estimated at 1300 square miles. A great number of smaller islands belong to the New Zealand group. The Chatham Islands and Kermadec Islands are outlying dependencies.

Minerals, Climate, Natural Productions.—With mineral wealth New Zealand is liberally supplied. Coal is obtained in many parts, and copper has been worked on a small scale. Gold is worked both in North and South Island. Extending through 12° of latitude, and having a greatly diversified surface, New Zealand has necessarily a very varied though a remarkably healthy climate. In temperature it resembles France and North Italy, but the humidity is considerably greater. Rapid changes are a notable feature of the weather. Among vegetable productions the most characteristic are the ferns (130 different species), which form almost the only vegetation over immense districts. Some of them are more than 30 feet high, and remarkable for the elegance of their forms. One of the most common is the *Pteris esculenta*, the root of which is used as food by the natives and greedily devoured by pigs. Another remarkable plant of great economical value (even furnishing an article of export) is the flax-plant (*Phormium tenax*). A number of the forest trees furnish valuable timber. Among others is the kauri or damar pine. Flowering plants are remarkably scarce, and

there are no indigenous fruits. The soil and climate of New Zealand, however, produce in perfection every English grain, grass, fruit, and vegetable. In the gardens of the warmer valleys fruits of a semitropical character—the pomegranate, citron, orange and olive—might be raised. In animals New Zealand is singularly deficient, only a sort of dog (now extinct), a rat, and two species of bats being indigenous. Rabbits have been introduced and have multiplied so as to become a perfect pest: pigs now run wild as well as cats. Pheasants, partridges, quails and red and fallow deer have also been successfully introduced. All the common European quadrupeds appear to be easily acclimatized. The native birds are remarkable neither for numbers nor for beauty of plumage. Pigeons and parrots are the most common. The apteryx, a peculiar bird so called from having no wings, is one of the most remarkable of the native birds. Among others are the huia or parson-bird and the owl-parrot. The gigantic moa is now extinct. The chief reptiles are a few lizards. The coast teems with fish, and seals are still numerous in some parts.

Aborigines.—The original natives of New Zealand, called Maoris, a people of Polynesian origin, are supposed to have emigrated from the Navigators' or the Sandwich Islands some centuries ago. Split up into numerous petty tribes, and wasting each other by internecine feuds, their numbers have been so reduced that they do not now much exceed 40,000, all of whom, with the exception of a few hundreds, are located in the North Island. By missionary efforts a great part of them have been converted to Christianity. They have acquired in many instances considerable property in stock, cultivated lands, etc., and in the neighborhood of the settlements they are adopting European dress and habits.

Industry, Commerce, etc.—Stock-rearing and agriculture are the most important industries, though mining is also an important occupation. There are about 20,000,000 sheep in the colony, and by far the most important export is wool, frozen meat and grain being also largely exported. Gold is the most valuable export next to wool; others are tallow, timber, kauri-gum. The imports naturally are chiefly manufactured goods: drapery, ironmongery, machinery, etc.; also tea, sugar, spirits, etc. There are upwards of 2500 miles of government railway in New Zealand open for traffic.

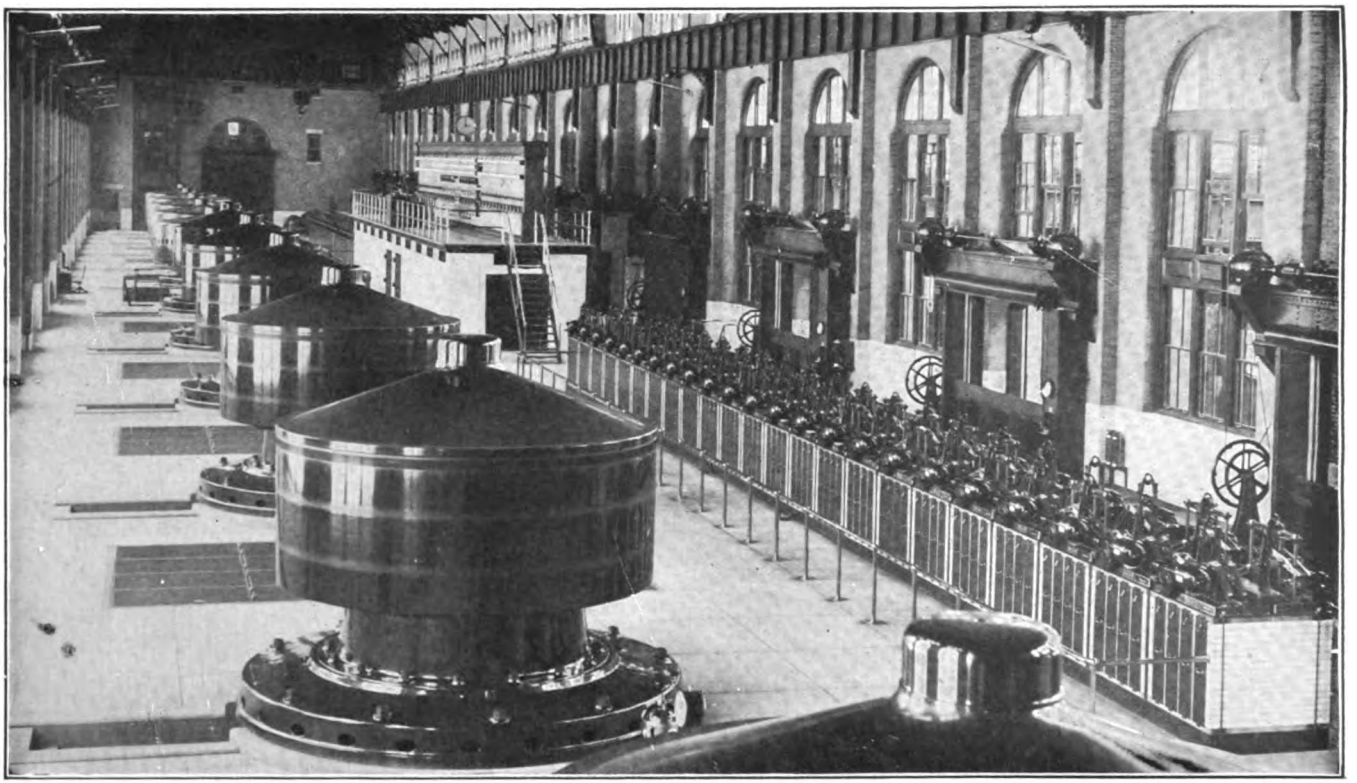
History.—New Zealand was first discovered by Tasman in 1642, but little was known of it till the visits of Cook in 1769 and 1774. The first permanent settlement was made by missionaries in 1815, but no regular authority was established by the British government till 1833, when a resident was appointed, with limited powers, and subordinate to the government of New South Wales. In 1840 New Zealand was erected into a colony; in 1841 it was formally separated from New South Wales and placed under its own independent governor; and in 1852 it received a constitution and responsible government. Troubles with the natives of the North Island about land have given rise to frequent Maori wars, and so late as 1886 a disturbance about land arose. In 1865 the seat of government was removed from Auckland to Wellington. In 1870 the New Zealand University was established. State socialism began in 1881, and has been extended to include many fields of industry since then. In 1907 the style Colony of New Zealand was changed to Dominion of New Zealand. During the European war (*q. v.*) the New Zealand troops participated in the fighting at the Dardanelles and on the western battle front.

New Zealand Flax. See *Flax (New Zealand)*.

New Zealand Spinage (*Tretragonia expansa*), a succulent trailing plant inhabiting New Zealand, Tasmania, Australia, South America and Japan. It has been introduced into Europe and North America as a substitute for spinage.

Ney (nā), Michel, Duke of Elchingen, Prince of the Moskwa, marshal and peer of France, was born in 1769 at Sarre-Louis, in the department of the Moselle. He entered the military service in 1788 as a private hussar, and rose by degrees to the rank of captain in 1794, adjutant-general in 1796, general of division in 1798, and as such he distinguished himself in the Rhine campaign. Appointed marshal of the empire by Napoleon in 1805, he achieved victory over the Austrians at Elchingen, and took part in the battle of Jena. During the Russian campaign he commanded the third division at the battle of the Moskwa, and conducted the rear guard in the disastrous retreat. In the campaign of 1813 his skill and courage decided the victory of Lützen, and assisted at Bautzen and Dresden. When Napoleon abdicated and the Bourbon dynasty was established Ney took the oath of allegiance to the king and received a command; but when the emperor landed from Elba his old general joined him at Lyons and opened the way to Paris. In

NIAGARA FALLS
View of the great waterfalls from the suspension bridge which crosses the Niagara River.



TURBINE GENERATORS, NIAGARA FALLS POWER HOUSE
Eleven turbine generators in the Niagara Falls Power House, each set developing 5000 horsepower.

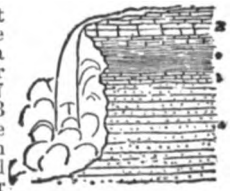
the campaign which followed it was Ney who led the attack on the British center at Waterloo, and after five horses had been killed under him he only retired from the field at nightfall. When the allies entered Paris he escaped in disguise to the provinces, but was finally arrested, brought back to Paris, tried for treason, and found guilty. The sentence was executed December 7, 1815.

Nez Perces (nez pers), a tribe of Indians, chiefly settled in Idaho, on the Lapwai River. The Nez Perces proper were loyal to the whites, but in 1877 the treaty reductions of their reservation led to a sanguinary outbreak on the part of the non-treaty members of the tribe, who attacked settlers, fought the soldiers, and then fled across Idaho, Montana and Dakota. They were overtaken and beaten, and the survivors (some 350) transferred to the Indian Territory. In 1885 some were restored to Idaho, and the rest joined the Colville Indians, in Washington.

Ngami (n'gä'mē), a former South African lake to the north of the Kalahari Desert; length about 37 miles, breadth about 15 miles. Its only feeder is the Teoge, and its outlet the Zouga. Ngami was first visited by Dr. Livingstone and Mr. Oswell in 1849. It was for the most part shallow, and has now practically disappeared, its place being taken by a reed-grown muck.

Nganhwuy (ngân-hwi'), a province of China, bounded by the provices of Kiangsu, Honan, Hupeh, Kiangsi and Chekiang. Green tea is extensively cultivated, and the province is rich in minerals. Pop. about 23,600,000. Capital Ngan-king-foo, on the left bank of the Yangtse-kiang; pop. 40,000.

Niagara (ni-ag'à-rà), a river of North America, separating Ontario from the State of New York, and conveying the waters of Lake Erie into Lake Ontario. It is 33½ miles long, and varies in breadth from 1 to 4 miles, being about the former where it issues from Lake Erie, near the city of Buffalo. It is occasionally interspersed with low wooded islands, the largest of which, Grand Island, has an area of 17,000 acres. The total descent in the river's course between the two lakes is 331 feet. About 15 miles from Lake Erie a sudden narrowing and descent in the channel causes what are called the Rapids, below which the river, here divided by Goat Island, is precipitated over the celebrated Falls. The rush of the river is such that the water is shot a clear 40 yards from the cliff, leaving a narrow pathway for a short distance below for the adventurous. The cataract on the south side of the island, called the American Fall, is 162 feet high, width 1125 feet; that on the Canadian side, called the Great or Horseshoe Fall, is 149 feet high, width 2100 feet. Below the falls the river rushes with great velocity down the sloping bottom of a narrow chasm for a distance of 7 miles. About 3 miles below the falls a sudden turn in the channel causes the water to whirl in a vast circular basin before renewing its journey. Logs and other floating material sometimes continue whirling here for many days. Several bridges cross the river below the falls, one of them a suspension bridge 1190 feet long and 190 feet above the water. The land on both sides of the river has been converted into an international park.



Section of the Horseshoe Fall, Niagara. *a*, Medina Sandstone, 300 feet; *b*, Clinton Limestone and Shale, 30 feet; *c*, Niagara, 165 feet, of which 85 feet are seen at the Fall.

Niagara Falls, a city and port of entry in Niagara Co., New York, on the Niagara River, 22 miles N. N. W. of Buffalo, on ten railroads. Electric energy is developed by the power plants here and transmitted to various electro-chemical industries. Seat of Niagara University and De Veaux College. Pop. (1910) 30,445; (1920) 50,760.

Niagara Falls, a manufacturing city of Welland Co., Ontario, on west bank of Niagara River below the falls. Has great hydro-electric plants and numerous industries. Pop. (1920 estimate) 14,800.

Niagara Falls, Power Plant, was constructed from the plans of the International Niagara Commission which met in London, England, 1889. They considered the utilization of electricity and compressed air for the conveyance of the power and selected the former; with a canal, one mile in length with wheel-pits 178′ deep, 140′ long and 20′ wide, each pit having a turbine wheel weighing forty tons. The turbines are attached to a dynamo each one of which develops five thousand horse-power. There are many of those in operation, other plants having been founded on the Canadian side of the river. Tunnels cut through solid rock carry off the waste water. Buffalo, twenty-two miles distant, and other cities are furnished with this electric current. A treaty signed between the United States and Great

Britain regulates the use of Niagara water power, giving Canada the privilege of using 32,100 cubic feet of water per second and the United States 16,300 Canada can supply power to the New York side. A greater use of water would be detrimental to the falls.

Niam Niam (ni'am ni'am), a negro race inhabiting a district of North Central Africa extending from 29° to 24° E. lon., and probably further to the west; and from about 4° to 6° N. lat. The Niam Niam are a hunting and agricultural people, and are of a compact and powerful build, with long nose, small mouth, broad lips and reddish-brown or copper-colored skin. Apparently at a comparatively recent period they have wandered from the west to their present habitation, and have become masters of the country. They have a well-founded reputation for cannibalism, though some tribes seem to have renounced the practice.

Niare, or BUSH COW (*Bos brachyceros*), a small wild ox, native to Western Africa.

Nias (nē-äs'), an island in the Malay Archipelago, lying west of Sumatra; length about 70, breadth about 20 miles. Its inhabitants, of the Malay race, are numerous, industrious and frugal, but at the same time avaricious, vindictive, and sanguinary. Rice, sugar and pepper are grown extensively. It belongs to the Dutch. Pop. 100,000.

Nibelungenlied (nē'bē-lụng-ên-lēt; 'Lay of the Nibelungen'), a German epic written in the Middle High German dialect, and dating from about the twelfth century. It is divided into thirty-nine sections, contains some 6000 lines, and is constructed in four-lined rhymed stanzas. The tale, briefly told, is this: Kriemhild lives with her brother Gunther, king of Burgundy, at Worms. To his court comes Siegfried, son of Siegemund, king of the Netherlands. This Siegfried is possessed of the Nibelungen gold hoard, a magic sword, a cloak of darkness, besides great strength and courage. Thus equipped he comes to the court and wins the love of Kriemhild. In gratitude for his success Siegfried undertakes to assist Gunther, the brother of his bride, in his efforts to win the hand of Brunhild, an Icelandic princess. Together they sail for the far north, and there Gunther succeeds, with the help of Siegfried's cloak of darkness, in winning the three test games of skill which the lady played with him. Still on the bridal night the princess mocked at Gunther her husband, wrestled with him, bound him, and hung him up scornfully against the wall. But the next night Gunther, with the invisible help of his friend Siegfried, overcomes the bride, and the latter carries away her girdle and ring. Siegfried and his wife Kriemhild next appear on a visit to the Burgundian court at Worms, where Gunther the king now resides with his wife Brunhild. While there the two ladies quarrel, and in her rage Kriemhild taunts Brunhild with having had dealings with her husband Siegfried, and in proof thereof she produces the ring and girdle which he took from her chamber on the bridal night. Brunhild bitterly resents this calumny and meditates vengeance. This she accomplishes by the hand of Hagen, one of her husband's warriors, who slays Siegfried in his sleep. The widow's revenge completes the story.

Nicæa (ni-sē'a; Nice), an ancient city of Asia Minor, capital of Bithynia, about 45 miles S. E. of Byzantium. Under the Roman Empire it retained long an exalted rank among the eastern cities, and is renowned in ecclesiastical history for the famous council held here in the reign of Constantine (A.D. 325), in which the formula bearing the name of the Nicene Creed was drawn up. After the foundation of the Latin Empire in Constantinople in 1204 the Greek Emperor Theodorus Lascaris made Nicæa the capital of his empire, which it continued to be until in 1261 the Greek emperors recovered Constantinople. It was finally taken by the Turks in 1330.

Nicander (nī-kan'der), a learned Greek physician and poet, a native of Claros, near Colophon, in Ionia, who flourished about 185-135 B.C. Two of his poems are extant.

Nicaragua (nē-kä-rä'gwä, or nik'a-), a republic of Central America, extending from the Pacific Ocean to the Caribbean Sea, and having on the north and northeast the State of Honduras, and on the south Costa Rica: area, about 51,660 square miles. The State is traversed by the Cordillera of Central America, between which and the Pacific coast there is a remarkable depression extending for 300 miles and containing Lake Nicaragua (which see) and the smaller Lake Managua at no great elevation above the sea. Along the coast is a chain of volcanic cones, rising in some cases to 7000 feet. From the Cordillera the surface slopes to the Carribean coast (Mosquito Territory), which is low and swampy. Nicaragua has a considerable number of rivers, the chief flowing to the Caribbean Sea, as the Coco and the San Juan. Veins of silver, copper and gold occur. The climate is on the whole healthy, the interior and mountainous

parts being more dry and cool than on the coasts. The vegetable productions include indigo, sugar, coffee, cacao, cotton, maize, rice, etc. Fruits of various kinds are plentiful. One of the principal sources of wealth consists in cattle, of which there are great numbers, the high plains affording excellent pasturage. The capital is Managua. In 1821 Nicaragua joined Guatemala, Costa Rica, Honduras and Salvador in revolting against Spain, and after a sanguinary civil war it achieved independence. It has been the scene of various revolutions and counter-revolutions. An outbreak in 1912, grew so serious that the intervention of the United States was necessary to bring about peace. The republic is governed by a president elected every four years, a Senate and a House of Representatives. The capital is Managua; largest city, Leon, the former capital. Pop. estimated at 705,000.

Nicaragua, LAKE, an extensive sheet of water in Central America, in the State of same name, 90 miles long northwest to southeast; greatest breadth, 40 miles; mean, 30 miles; 110 feet above the Pacific, from which it is separated by a strip of land 12 miles wide. The river San Juan de Nicaragua flows from its southeastern extremity into the Caribbean Sea, and at its northwestern extremity it is connected with the smaller Lake of Managua, or Leon, by the river Penaloya. Steamers now ply upon it, as it forms a link in the traffic route.

Nicaragua Canal, a canal that was projected for the purpose of providing a waterway for ships across Central America from the Pacific to the Atlantic, passing through Nicaragua, and utilizing Lake Nicaragua and the San Juan River. The total length of the route was to be 170 miles from Greytown, on the Caribbean Sea, to Brito, on the Pacific. Of this 64½ miles were to consist of free navigation in the San Juan River, and 56½ of free navigation in Lake Nicaragua; total 121 miles. A beginning had been made by the United States government, when this work, estimated to cost $180,000,000, was abandoned for the Panama route. See *Panama Canal.*

Nicaragua Wood, the wood of a tree growing in Nicaragua, supposed by some to be a species of *Cæsalpinia,* and by others of *Hæmatoxylon.* This wood and a variety called peach-wood are exported for the use of dyers.

Nicastro (nē-kȧs'trō), a town in South Italy, province of Catanzaro, situated w. of the Apennines, in the Bay of Sant' Eufemia. It is the see of a bishop and a place of considerable trade. Pop. 13,671.

Niccolini (nē̆k-ko-lē̆nē̆), GIOVANNI BATTISTA, an Italian dramatist, born in 1785; died in 1861. He studied at the University of Pisa; published his first poem in 1804; became in 1807 librarian and professor of history in the Academy of Fine Arts in Florence, and in 1810 produced *Polissena,* his first tragedy. Other tragedies followed, partly on classical, partly on modern subjects which procured for their author a wide fame.

Nice (nēs; Italian, *Nizza;* ancient, *Nicæa*), a city and seaport of France, on the Mediterranean, capital of the department of Alpes Maritimes, beautifully situated near the base of the Maritime Alps, and on both sides of the Paglion, a mountain torrent of short and rapid course. The original town was clustered round a hill near the shore, crowned by a strong castle. The new city lies to the west and north of this, on the right bank of the Paglion, and continues to spread rapidly. There are

two squares, many fine boulevards; along the whole front of the city towards the sea is a broad public promenade, and the pier has a bathing establishment attached. Nice is much resorted to as a health resort during winter. The climate is mild, the mean temperature being 60° F.; but the changes of wind are sudden, especially in spring. Nice possesses silk, cotton and paper mills, oil mills, etc. The harbor or port is small and open to the southeast. The exports consist principally of oil, wine and silk, with essences, perfumes, etc. Nice belonged to Italy previous to 1860. Pop. 142,940.

Nice, COUNCILS OF, ecclesiastical councils held at Nice or Nicæa, in Asia Minor, in 325 and 787. The object of the first Council of Nice, which was convened by Constantine, was to settle the controversies which had arisen in regard to the doctrine of the Trinity. The session lasted about two months. A creed was adopted by the council in its later form known as the Nicene Creed (which see). The council of 787 was summoned by the Empress Irene, with the concurrence of the pope, and it decreed that images were to be used as aids to devotion.

Nicene Creed (nī'zēn krēd), a summary of Christian faith adopted by the Council of Nice against Arianism A.D. 325, altered and confirmed by the Council of Constantinople A.D. 381. Its characteristics are the insertion of the term 'of one substance with the Father,' directed against the Arian heresy; the insertion of the words 'and the Son'; and the omission of the clause 'He descended into Hell.' It is recited both in the Roman Catholic and in the Anglican Church liturgies.

Niche (nich), a recess in a wall for the reception of a statue, a vase, or of some other ornament.

Nichol (nik'ol), JOHN, son of Professor John P. Nichol, born at Montrose, Scotland, in 1833; educated at Glasgow and Oxford Universities. From 1861 to 1889 he was professor of English Literature in Glasgow University. Besides his contributions to the *Encyclopædia Britannica* and the *Westminster* and *North British Reviews*, etc., he published the following:—*Tables of European Literature and History* (1876); *Tables of Ancient Literature and History* (1877); *English Composition* (1879); *Byron* (1880); *The Death of Themistocles and other Poems* (1881); *American Literature* (1882); *Kant* (1889); etc. He died in 1894.

Nichol, JOHN PRINGLE, astronomer, born in 1804, at Brechin, Forfarshire; died in 1859. Licensed for the Scottish Church, he turned his attention to astronomy, and acquired so much reputation that in 1836 he was appointed professor of astronomy in Glasgow University. Among Dr. Nichol's literary works may be mentioned: *The Architecture of the Heavens* (1838); *Contemplations of the Solar System* (1838); *The Stellar Universe* (1848); and the *Planetary System* (1851). He likewise edited a *Cyclopædia of Physical Sciences*, published in 1857.

Nicholas I (nīk'o-lās), NIKOLAI PAVLOVICH, Emperor of Russia, third son of the Emperor Paul I, was born in 1796; died in 1855. He ascended the throne in 1825. He made war with Persia in 1827-28; joined in the Treaty of London, which secured the independence of Greece; and was one of the allied monarchs who destroyed the Turkish fleet at Navarino in 1827. This affair led to war between Russia and Turkey, in which the latter was defeated, paid indemnity, and signed the treaty of peace at Adrianople in 1829. He suppressed the Polish insurrection which broke out in the following year with relentless severity. In 1848 Nicholas assisted Austria with an army corps in putting down the rising in Hungary. Early in 1852 began the Russian effort to take over the holy places and assume the protectorate of the Christians in Palestine. This led to the Crimean war, before the close of which Nicholas died from lung disease.

Nicholas II, Czar of Russia from 1894 to 1917, was born in 1868 and succeeded to the throne on the death of his father, Alexander III. Although the promoter of the Hague Conference, which had for its object the establishment of perpetual peace, he ruled his country with the absolutist policy of his father, believing unreservedly in the principle of autocracy; and penalties of death and banishment to Siberia were imposed on many thousands of his subjects. Among the leading events of his reign were the alliance of Russia with France, the building of the trans-Siberian railway, the extension of Russian dominion in Manchuria, the disastrous war with Japan, and the still more disastrous war with Germany, which occurred as the result of the Austro-Serbian dispute. (See *European War.*) In the midst of the war Nicholas was forced to abdicate, March 16, 1917. For a time he lived at Tsarskoe-Selo. Later he was transferred to Tobolsk, Siberia, and in May, 1918, to Yekaterinberg. A Russian government dispatch announced his execution on July 16, 1918, by the Ural Regional Council.

Nicias (nish'e-as), an Athenian statesman and general, who displayed much skill and activity in the time of the Peloponnesian war. He was put to death after the ill-success of his expedition to Sicily (B. C. 413).

Nickel (nik'el), a metallic element of silver-white color and great hardness, capable of taking a fine polish. It is magnetic at ordinary temperatures and very difficult to purify. When pure it is malleable and ductile. Its chemical symbol is Ni, atomic weight 58.7, specific gravity 8.90 in the solid state, melting point about 1450° Centigrade. Nickel is largely used in the manufacture of german silver (copper-zinc-nickel), nickel-steel and in electro-plating. Nickel-steel has a much higher resistance to corrosion than carbon steel, high resistance to stresses combined with great malleability and ease of working. It is largely used in the manufacture of armor plate and rails (3.5 per cent nickel) on account of its unequalled hardness and toughness, and in making structural steel. Nickel-steel, if it contains more than 36 per cent of nickel has the lowest coefficient of expansion known and is much used for scientific instruments on this account. The element was discovered by Cronstedt in 1751. Nickel is usually associated with cobalt, in garnierite, gersdorffite, millerite, niccolite, pentlandite, and certain other minerals widely distributed. The discovery of garnierite in New Caledonia, nickeliferous pyrrhotite in Sudbury, Ontario, Canada, and niccolite, smaltite and metallic silver at Cobalt, Canada, have made these localities the principal sources of nickel ores, the Sudbury district supplying about 90 per cent of the world's output.

Nickel-glance, a grayish-white, massive, and granular ore of nickel, consisting of 35.5 nickel, 45.2 arsenic and 19.3 sulphur.

Nickel-plating, is the process by which a coating of nickel is placed upon another metal, and the essentials of the process, as in electroplating, are a proper solution of the metal and an electric battery. See *Electrometallurgy.*

Nicobar Islands (nik-ō-bär'), a group situated in the Indian Ocean northwest of Sumatra; area, about 426 square miles. They are well wooded and yield cocoanuts and tropical fruits in abundance. The natives, who seem to be of the Malay race, are reported to be lazy, cowardly and treacherous. Cocoanuts are extensively exported, also edible nests, trepang, etc. The islands were occupied by Britain in 1869, and are governed along with the Andamans, the chief station being Nancowry, with a fine harbor. Pop. 6700.

Nicol (nik'ul), ERSKINE, painter, born in Leith, Scotland, in 1825; received his education in art at the Trustees' Academy, Edinburgh, resided some time in Ireland, where he received his peculiar bent as a delineator of Irish life and manners; settled in London (1862), and contributed regularly to the Royal Academy, of which he was elected an associate in 1866. Among his well-known pictures of Irish subjects are *Notice to Quit, Renewal of the Lease Refused, Bothered, Among the Old Masters* and *Interviewing the Member.*

Nicolaiev (nyē-ka-lā'yef, or NICOLAEF), one of the principal naval stations of Russia, on the Black Sea, in the government of Kherson and 36 miles northwest of the town of Kherson, at the confluence of the Ingul and Bug. It occupies a large space, is fortified and well built, with wide streets and a finely planted boulevard. It was founded in 1791, and since its connection with the Russian railway system its trade and importance have vastly increased. Pop. (1910) 103,500.

Nicolaitans (nik-u-lā'i-tanz), a sect in the early Christian Church, so named from *Nicolas,* a deacon of the church of Jerusalem. They are characterized as inclining to licentious and pagan practices, Rev. ii, 6.

Nicolas (nik'o-las), ST., a town in Belgium, in East Flanders, 19 miles E. N. E. of Ghent, in one of the best cultivated and most populous districts in Europe. Its manufactures are cotton, woolen, linen, and silk goods, lace, etc. Pop. 31,080.

Nicolas, SIR NICHOLAS HARRIS, an English writer, son of a naval officer, born in 1799; died in 1848. He entered the navy; attained the rank of lieutenant; afterwards studied law, and was called to the bar in 1825. He wrote a number of valuable biographies for the Aldine edition of the poets, and among his many works are *Synopsis of the Peerage of England: The Chronology of History; History of the Orders of Knighthood of the British Empire; Despatches and Letters of Lord Nelson; Memoirs of Sir Christopher Hatton.*

Nicolay (nik'o-lā), JOHN GEORGE, author, born at Essingen, Bavaria, in 1832; died in 1901. He came to the United States, became a printer in Illinois and subsequently private secretary to President Lincoln. He was consul at Paris, 1865-69, and marshal of the Supreme Court, 1872-87. He wrote *The Outbreak of the Rebellion* and with John

Hay wrote *Abraham Lincoln: A History*, and edited Lincoln's complete works.

Nicole (nē-kol), PIERRE, a French writer, one of the so-called Port-royalists, born at Chartres in 1625; died in Paris in 1695. From the provinces he proceeded to Paris, where he studied theology; afterwards he entered Port Royal, where he was engaged in teaching and associated himself with Arnauld in the preparation of his work on logic. Besides this he translated *Pascal's Letters* into Latin, and wrote *Essais de Morale* and *Les Imaginaires et les Visionnaires*, the latter provoking a severe attack from Racine.

Nicomedia (nik-u-mē-di'a), an ancient city of Asia Minor. See *Ismid*.

Nicopoli (ni-kop'o-lē), a city of Bulgaria, on the Danube, with a strong citadel and other works. Pop. 5815.

Nicopolis (ni-kop'o-lis; 'City of Victory'), the name of many ancient cities. One of the most celebrated was in Epirus on the northern side of the Ambracian Gulf (Gulf of Arta), built by Augustus in commemoration of his naval victory over Antony at Actium.

Nicosia (nē-ko-zē'a), a town in the province of Catania, Sicily, 39 miles W. N. W. of the town of Catania, the see of a bishop. Pop. 16,441.

Nicosia, or LEFKOSIA, the capital of the Island of Cyprus, situated in the center of the island. Its lofty walls and bastions still present an imposing appearance, and it has a number of mosques and Greek churches, the residence of the High Commissioner, etc. It has manufactures of silk, cotton, leather. Pop. (1911) 16,052.

Nicot (nē-kō), JEAN, born in 1530; died in 1600; was French ambassador at the court of Portugal, where he was presented with some seeds of the tobacco plant, which he introduced into France about 1560. The botanical term for tobacco (*Nicotiana*) is derived from his name.

Nicotiana (nik-u-ti-a'na), the tobacco genus of plants. See *Tobacco*.

Nicotine (nik'u-tin), a volatile alkaloid base obtained from tobacco. It forms a colorless, clear, oily liquid, which has a strong odor of tobacco. It is highly poisonous, and combines with acids, forming acrid and pungent salts.

Nictitating Membrane (nik-ti-tā'ting), or 'THIRD EYELID,' a thin membrane by which the process of winking is performed in certain animals, and which covers and protects the eyes from dust or from too much light. It is chiefly found in birds and fishes, and is represented in a rudimentary condition in man, and higher mammals generally, by the 'semi-lunar folds' situated at the inner or nasal angle of the eye.

Niebelungenlied. See *Nibelungenlied*.

Niebuhr (nē'bör), BARTHOLD GEORG, historian, born at Copenhagen in 1776 (see next article); died at Bonn in 1831. He studied law at Göttingen, and philosophy at the University of Kiel; became, in 1796, private secretary to the Danish minister of finance, and soon after under-librarian in the royal library of Copenhagen; while in 1798 he visited England and attended the University of Edinburgh for one session. Niebuhr subsequently transferred his services to Prussia, and held various government offices. Having been appointed historiographer-royal he delivered lectures on Roman history in the University of Berlin, and in 1811 published them in two volumes. In 1816 he was appointed Prussian minister to the papal court at Rome and there he resided until 1822, chiefly occupied in historical research. At the latter date he returned to Bonn and became adjunct professor of ancient history at the university. Here he continued his *Roman History*, the third volume of which appeared after his death.

Niebuhr, KARSTENS, a German traveler, father of the above born in Hanover in 1733; died in 1815. In 1761 he joined the expedition sent by Frederick V. of Denmark, to explore Arabia. As the result of the expedition he published *Beschreibung von Arabien* and *Reisebeschreibung von Arabien und anderen umliegenden Ländern*.

Niehaus (nē'hous), CHARLES HENRY, was born of German parentage at Cincinnati, Ohio, 1855, and studied art in his native city and at Munich and Rome. He established himself in New York City in 1885, and became in 1906 a national academician. The list of his statues includes Garfield at Cincinnati, Lincoln, Farragut, and McKinley at Muskegon, Michigan, etc.

Niel (ni-el), ADOLPHE, a French marshal, born in 1802; died in 1869. He was educated at the Ecole Polytechnique, Paris, and the Military School, Metz; took part in the expedition against Constantine in Algeria; assisted as head of the staff of engineers at the siege of Rome in 1849 during the revolutionary movement under Garibaldi; commanded the engineers and planned the operations

against Sebastopol in 1854-55, distinguished himself in the Italian campaign of 1859, and was thereafter made a marshal of France by Napoleon III.

Niello (ni-el'ō), a method of ornamenting metal plates, much practiced in the middle ages, and which gave rise to copperplate engraving. The lines of a design were cut in the metal, and filled up with a black or colored composition, which gave effect to the intaglio drawing.

Nielson (nēl'sun), JULIA, actress, born at London in 1868; appeared on the stage in 1888. She toured Great Britain and the United States, her greatest success being as *Rosalind*, in *As You Like It*. She married Fred Terry, an actor.

Niemen (nyā'men), or MEMEL, a large river which rises in Russia, flows at first west through the government of Vilna and past the town of Grodno; then north, forming the boundary between Poland and the government of Vilna; then again west, separating Kovno and Poland; and finally enters East Prussia, passes Tilsit, and falls into the Kurisches Haff. It is 640 miles in length, and is navigable as far as Grodno, 400 miles.

Nietzsche (nēt'she), FRIEDRICH WILHELM, philosopher, born in Saxony, in 1844; died in 1900. He won distinction by works on the origin of tragedy, etc. In 1878 he began a long series of works in which he developed a revolutionary philosophy, denouncing religion and advocating the principle of a pitiless struggle for existence. He became insane and was confined in a hospital in 1895.

Nièvre (nyāvr), a department of Central France, bounded by Yonne, Cher, Allier, Saône-et-Loire, and Côte-d'Or; area, 2631 square miles. It receives its name from the Nièvre, a small tributary of the Loire. It is generally hilly, is only of indifferent fertility, produces some good wine, and has nearly a third of its surface covered with wood. Its minerals include iron and coal, and the chief manufactures are woolen cloths, linen, cutlery, etc. Pop. 313,972.

Niflheim (nif'l-hīm), in Scandinavian mythology, the region of endless cold and everlasting night, ruled over by Hela.

Nigella (nig-el'la), fennel flowers, a genus of annual plants, nat. order Ranunculaceæ.

Niger (nī'jėr), the name of a great river of Western Africa, which rises on the north side of the Kong Mountains, flows north and northeast, afterwards turns southeast and south until, by various channels, it enters the Gulf of Guinea, its total length being about 2600 miles. Throughout its course the river is known under various names, such as Joliba, Kworra (Quorra), Mayo, etc. Not much is known of the river until it reaches Sego, about 340 miles from its source; but here it enters upon a fertile tract of country which continues until Timbuctoo is reached. Large islands divide the river channel, and its tendency here is to spread over the flat country in a network of small streams. At the town of Burrum, where it trends in a curve to the southeast, the river is known as the Mayo until it reaches its confluence with the Benué, where it becomes known as the Kworra. At Aboh, about 100 miles from the sea, the great delta of the Niger begins. This delta extends along the coast for about 150 miles, and is intersected by a network of channels and islands, the principal navigable courses being the Nun, Bonny and Mari. Mungo Park was the first European who explored this river (1790-97).

Nigeria (nī-jer'i-a), a great region of Western Africa within the British sphere of influence, comprising the Niger delta, and a tract on both sides of the river more than 1000 miles from its mouth, as well as the valley of the Benué for a long distance. A great part of this tract was formerly administered by the Royal Niger Company, a British company chartered in 1886. In 1898 the French encroached on this territory and caused great danger of war between that country and Great Britain. The Royal Niger Company surrendered its charter in 1900, and the two protectorates of Northern and Southern Nigeria were formed. Other territory, notably Lagos (bought from a native king in 1861) was added, and in 1914 was formed the Colony and Protectorate of Nigeria, with Lagos as the capital. Area, 332,000 sq. miles; pop. about 16,750,000.

Night-blindness, being *hemeralopia*, is a disease in which the eyes enjoy the faculty of seeing while the sun is above the horizon, but are incapable of seeing by the aid of artificial light.

Night-hawk, a species of the goat-sucker family (*Chordeiles Virginiānus*), a bird universally known in the United States, 9½ inches in length and 23 in extent of wing. It is a bird of strong and vigorous flight, and its prey consists of beetles and other large insects. Other American species are the 'chuck-will's widow' (*C. carolinensis*) and the 'whip-poor-will' (*C. vocif-*

ĕrus), both of which, like the night-hawk, arrive in May, and leave the States in September.

Night-heron, a wading bird of several species belonging to the family Ardeidæ (herons and cranes). The species occur in Europe, Asia, Africa and America. The common night-heron is the *Nycticŏrax Gardeni* or *europæus*. It is about 20 inches in length, and has three long narrow feathers proceeding from the nape of the neck, and hanging backwards.

Nightingale (nī'tin-gāl), a well-known passerine bird (*Luscinia philomēla*) of the thrush family. The nightingale sings at night, and its famed chant is the love song of the male, which ceases when the female has hatched her brood. It is a native of many parts of Europe and Asia, and of the north of Africa. It is migratory, extending its summer migrations as far north as the south of Sweden. In England, where it appears about the middle of April, it is rather a local bird, some parts appearing to be quite unsuited to its habits; the northern counties are seldom visited, and in Scotland and Ireland it is unknown. It feeds on caterpillars and other larvæ, frequents hedges and thickets, and builds its nest on the ground or near it, laying four or five eggs of a blue color. The young are hatched in June, and are prepared to accompany their parents in their southward migration in August. It is solitary in its habits, and its coloring is very inconspicuous. Another species inhabits Southeastern Europe.

Nightingale (*Luscinia philomela*).

Nightingale, Florence, daughter of William Shore Nightingale, Embly Park, Hampshire, was born at Florence in 1820. At an early age she manifested a keen interest in suffering humanity, and from philanthropic motives visited the chief military hospitals in Europe, and studied the chief nursing systems. During the Crimean war (1854) the hospital accommodation was found to be very defective, and Miss Nightingale promptly volunteered to organize a select band of nurses at Scutari. The offer was accepted by the War Office, and within a week Miss Nightingale was on her way to the East, where she rendered invaluable service to the sick and wounded by her incessant labors in nursing and hospital reform. The strain, both mental and physical, which this work demanded permanently injured her health; yet notwithstanding her confinement to a sick room, she continued to give her experience in the interest of hospital reform, and for this purpose she was consulted during the American Civil war and the Franco-German war. She published *Notes on Hospitals* (1859), *Notes on Nursing* (1806), *On the Sanitary State of the Army in India* (1863), *Notes on Lying-in Institutions* (1871), and *Life or Death in India* (1873). She died in 1910.

Night-jar, one of the British names of the common goat-sucker.

Nightmare (nīt'mār), a state of oppression or feeling of suffocation which sometimes comes on during sleep, and is accompanied by a feeling of intense anxiety, fear, or horror, the sufferer feeling an enormous weight on his breast, and imagining that he is pursued by a phantom, monster, or wild beast, or threatened by some other danger from which he can make no exertion to escape. The sufferer wakens after a short time in a state of great terror, the body often covered with sweat. The proximate cause of nightmare is said to be irregularity of the circulation in the chest or brain, and the disorder is generally due to repletion and indigestion, but sometimes to the fact of the sufferer lying in an awkward position in bed.

Nightshade (nīt'shād), the English name of various species of plants, chiefly of the genus *Solānum* (to which the potato belongs). The woody nightshade or bittersweet (*S. Dulcamāra*) and common or garden nightshade (*S. nigrum*) are European plants, the first growing in hedges and among bushes, and the latter in gardens, fields, and waste places. The root and leaves of *S. Dulcamāra* are narcotic, and have been applied to various medicinal uses. The berries, if not absolutely poisonous, are suspicious. This plant has been introduced from Britain into the United States, and grows wild in many localities. *S. nigrum* is fetid and narcotic, and has also been employed medicinally. *Deadly nightshade* is *Atrŏpa Belladonna*.

(See *Belladonna.*) For *enchanter's nightshade*, see that article.

Nigrin (nig'rin), an ore of titanium, found in black grains or rolled pieces, containing about 14 per cent of iron. It occurs in Ceylon and Transylvania.

Nigritia. See *Soudan.*

Nihilism (nī'hil-izm), the name given to the early Russian form of revolutionary Socialism, and first used by Tourguenieff in his novel, *Fathers and Children.* It was at first opposed to methods of force and confined itself to spoken propaganda, but it grew into an organization that believed the overthrow of autocracy could only be achieved by assassination. Its first principle was an insistence upon absolute individualism; all forms of government were to be swept away, all class distinctions annihilated. Under Bakunin (*q. v.*) and Herzen (*q. v.*) the movement acquired great strength, and Russian students began to proclaim the new gospel of individualism, or its more moderate form, the return to the *mir*, or village commune, freed from control by the state.

About 1874 the Russian government began to interfere, the newspapers which advocated the Nihilist doctrine were suppressed, foreign pamphlets seized, and large groups of the revolutionists summarily tried and condemned to death and exile. Hitherto the Nihilists had spread their principles by peaceful means, but after the trial in 1877, in which 99 persons were sent to Siberia, a secret and sanguinary struggle between armed assassins and the government began. The first startling indication of the new departure was the murder of General Trepoff by a young woman named Vera Sassulitch, and this was followed by the assassination of Generals Mezentzoff and Drenteln, Prince Krapotkin, Governor of Kharkov, and Commander Heyking. The incendiary followed the assassin. In June, 1879, no fewer than 3500 fires broke out in Petrograd and other large towns, most of which were attributed to the Nihilists. Various attempts were made to assassinate the emperor. Four shots were fired at him by Solovieff, a train in which he was supposed to travel was wrecked by Hartmann, an apartment in the Winter Palace in Petrograd was blown up, and at last, in March, 1881, Alexander II was murdered by a bomb thrown beneath his carriage in the street near the palace. Nihilism became absorbed in the more moderate revolutionary parties and was not in evidence in 1917 when the almost bloodless revolution ousted Czar Nicholas.

Niigata (nē-i-gä'tä), the chief town of the province of Echigo, Japan, situated on the west coast of the island of Hondo and on the left bank of the Shinano. This port was opened to foreign trade by the treaty of 1860; but the obstructed state of the river, the open anchorage, and the severe winter has hitherto prevented the development of much trade. The town is well built, the streets are traversed by canals, there is a hospital and a college, and considerable coasting trade. Pop. (1913) 61,333.

Nijkerk (nī'kerk), a town of Holland, province Gelderland, near the Zuider Zee, with which it communicates by canal. Pop. 8124.

Nijmegen (nī'mā-ghen), NYMEGEN, or NIMEGUEN (nim'e-gen), a city in the Dutch province of Gelderland, delightfully situated on the slopes of several hills, reaching down to the Waal. It has a fine old church (St. Stephen's), and a Renaissance town hall of the sixteenth century. The industrial occupations include tanning, brewing, metal goods, cotton manufactures, etc. The town is celebrated for the treaty of peace concluded in 1678 between France and Holland and Spain, and for that of 1679 between the German Empire, France and Sweden. It was formerly a strong fortress, but the fortifications have been recently abolished. Pop. (1914) 50,635.

Nijni-Novgorod (nizh'nē nov'gorod), a town in Russia, capital of government of same name, at the confluence of the Oka and Volga, 255 miles east of Moscow. The town forms three parts: the upper district, including the citadel; the lower portion, called the Nijni Bazaar; and the suburb, occupied by the great annual fair, and containing 6500 booths, besides other structures for its accommodation. This fair, begun in 1816, is held annually between July 15 and September 1, O.S. Here there are gathered together an immense multitude of people (say 250,000) from all parts of Russia and many parts of Asia, and the annual value of the merchandise sold is estimated at about $150,000,000. The chief products sold are cotton, woolen, and linen goods, tea, silk and silk goods, metal wares, furs, leather, porcelain, earthenware and glass, coffee, wine. Pop. 108,820.—The province has an area of 19,704 square miles. The surface forms an extensive plain, occasionally broken and diversified by low undulating hills. It is drained by the Volga. The soil is poor, and the crops, chiefly hemp and flax, not very abundant. A large

part is covered with forests. Pop. 1,600,304.

Nijni-Tagilsk (n i zh-nē-tȧ-gilsk'), a town of Russia amid the Ural Mountains, in the government of Perm, and 150 miles east of the town of Perm, in the midst of a district very rich in minerals. Pop. about 30,000.

Nikē (nī'kē), in Greek mythology, the goddess of victory. She was rewarded by Zeus with the permission to live in Olympus, for the readiness with which she came to his assistance in the war with the Titans. There is a temple to her on the Acropolis of Athens still in excellent preservation.

Nikolaef. See *Nicolaiev.*

Nikolayevsk (r y ē - k ȧ -lā'yefsk), a town of Russia, gov. of Samara, on the Igris, a tributary of the Volga. Pop. 8200.

Nikolsburg (ni'kolz-bŏrg), or NIKLASBURG, a town of Austria, in Moravia, 27 miles south of Brünn. There are linen and woolen manufactures and some trade. Pop. 8091.

Nikopol (nē-ko'pōl), a town of Southern Russia, government of Ekaterinoslav, on the Dnieper. Pop. 21,282.

Nile (nīl), a great historic river in Africa, the main stream of which, known as the *Bahr-el-Abiad*, or White Nile, has its chief source in the equatorial lake Victoria Nyanza. What is known as the *Bahr-el-Azrek*, or Blue Nile, a much smaller stream, joins the White Nile at Khartoom, lat. 15° 40′ N. The source of the Blue Nile was discovered in the Abyssinian Highlands by Bruce in 1770, while the source of the other, or true Nile, was for long the subject of speculation and exploration. The discoveries, however, of Speke and Grant in 1861-62, of Sir Samuel Baker in 1863-64, and of subsequent explorers, have established the fact that the head waters of the Nile are collected by a great lake situated on the equator, called Ukerewe, or Victoria Nyanza. The Nile, near where it flows out of Lake Victoria, forms the Ripon Falls, then flows generally northwest; about lat. 1° 40′ N. it expands into Lake Ibrahim Pasha, afterwards forms the Falls of Karuma and the Murchison Falls, and then enters another lake, the Albert Nyanza, at an elevation of about 2550 feet. This lake, as was discovered by Henry M. Stanley, receives the waters of another lake further to the southwest, Lake Muta Nzige, or Albert Edward, the channel of communication being the river Semliki. From the Albert Nyanza to the Mediterranean the general course of the Nile is in a northerly direction, with numerous windings. Above Gondokoro, about lat. 5° N., the river forms a series of cataracts; but between these falls and the Albert Nyanza, a distance of 164 miles, the river is broad, deep and navigable. Not far below Gondokoro the Nile begins to flow more to the west till it reaches lat. 9° N., where it receives the Bahr-el-Ghazal, one of its chief tributaries. On receiving this affluent it turns due east for about 100 miles, and then after receiving the Sobat from the southeast flows almost due north to Khartoom. It receives its last tributary, the Atbara, from the Abyssinian frontier, for the rest of its course (some 1500 miles) being fed by no contributory stream. Between this point and the frontiers of Egypt occur several rapids or cataracts presenting greater or less obstacles to navigation, there being also another cataract some distance below Khartoom. In Egypt, at the head of the Delta near Cairo, it divides into two main branches, leading down respectively to Rosetta and Damietta, where they enter the Mediterranean. As rain scarcely falls in the greater part of the valley of the Nile the river owes its supplies to the copious rains and the vast lake areas of the tropical regions in which it takes its rise, and its volume thus depends upon the season. It begins to increase in June, attains its greatest height about September, and then subsides as gradually as it rose. (See *Egypt.*) The ordinary rise at Cairo is about 40 feet. During the flood a great portion of the Delta, and of the valley of Egypt higher up, is inundated. This annual inundation, with all the bounty which it brings, is watched and waited eagerly, and no doubt it was from this character of benefactor that the Nile has been worshiped as a god alike by Egyptians, Greeks and Romans. Its length is estimated at nearly 4200 miles, or rather less than that of the Mississippi-Missouri. Its usefulness in irrigation has been greatly increased under British influence by large dams, the barrage at Assuit, and the colossal dam at Assuan, which is estimated to have a holding power of 37,500,000,000 cubic feet, capable of irrigating hundreds of thousands of acres.

Nile, BATTLE OF THE. See *Aboukir.*

Niles, a city of Trumbull Co., Ohio, on the Mahoning River, 55 miles E. S. E. of Cleveland on three trunk railroads. Produces sheet metal, sheet-metal products, trolley cars, printing presses, electric bulbs, etc. Pop. (1920) 13,080.

Niles, a city of Berrien Co., Michigan, on the St. Joseph's River, 112 miles s. w. of Lansing. It has 17 manufactories, and ships large quantities of fruit and livestock. Pop. 7311.

Nilgiri Hills. See *Neilgherry Hills.*

Nilometer (nī-lom'e-tėr), an instrument for measuring the rise of water in the Nile during its periodical floods. The nilometer in the island of Rhoda (Er-Rôdah), opposite to Cairo, consists of a slender graduated pillar standing in a well which communicates with the river. The pillar is divided into 24 cubits, each of which measures 21.4 inches. When the inundation reaches the height of 21 cubits it is considered adequate.

Nilsson (nil'son), CHRISTINE, born at Hassaby, near Wexib, in Sweden in 1843. Accompanied by her brother she used to sing at village fairs and places of public resort, where she also played on the violin. In 1857 her talent attracted the attention of a wealthy gentleman, who had her educated as a singer at Stockholm, and afterwards at Paris. In 1864 she made her first appearance as *Violetta* in *La Traviata* at the Théâtre Lyrique, Paris, and she appeared in 1867 for the first time at Her Majesty's Theater, London. On several occasions she visited America with the utmost success in such rôles as *Ophelia* in Ambroise Thomas' 'Hamlet' and Gounod's *Faust*. In 1872 she married M. Auguste Rouzaud (died, 1882) in 1886 she married Count A. de Miranda (died, 1902). She died at Copenhagen, November 22, 1921.

Nimbus. See *Cloud.*

Nimbus (nim'bus), a term applied in art, especially in sacred art, to a kind of halo or disc surrounding the head in representations of divine or sacred personages; as also to a disc or circle sometimes depicted round the heads of emperors and other great men. The nimbus in representations of God the Father is of a triangular form, with rays diverging from it all round, or in the form shown in the cut; the nimbus in representations of Christ contains a cross more or less enriched; that of the Virgin Mary consists of a circlet of small stars, and that of angels and saints is a circle of small rays. When the nimbus is depicted of a square form it indicates that the person was alive at the time of delineation. Nimbus is very frequently confounded with *aureola* and *glory.*

Nimeguen. See *Nijmegen.*

Nîmes, or NISMES (nēm), a city of Southern France, capital of the department of Gard, 62 miles northwest of Marseilles. It is an episcopal see, and consists of an old central quarter surrounded by handsome boulevards, beyond which are the modern quarters. Its manufactures are chiefly of silk and cotton goods; it has a considerable commerce, and is the great entrepot of Southern France for raw silk. Among

The Nimbus as variously represented in Sacred and Legendary Art.—1, God the Father. 2 and 3, Christ. 4, Charlemagne. 5, Emperor Henry II.

the buildings are the cathedral, the church of St. Perpetua, the Palais de Justice, etc.; but Nîmes is chiefly remarkable for its Roman remains, including an ancient temple, with thirty beautiful Corinthian columns, now serving as a museum and known as the *Maison Carrée;* the amphitheater, a circus capable of seating 20,000 persons; the temple of Diana; the ancient Tour Magne, on a hill outside of the city, supposed to have been a mausoleum; and a Roman gateway. Nîmes (anc. *Neumausus*) is supposed to have been built by a Greek colony, and was afterwards for about 500 years in the possession of the Romans. In the sixteenth century it became a stronghold of Calvinism, and suffered much during the civil wars, as also by the revocation of the Edic' of Nantes, and during the revolution; but latterly it is a busy manufacturing center. Pop. (1911) 80,437.

Nimrod (nim'rod), described in Gen. x, 8 to 12, as a descendant of Ham, a son of Cush, a mighty hunter before the Lord, and the beginning of

whose kingdom was Babel, Erech, Accad and Calneh in the land of Shinar.

Nimrûd (nim'rud), the name given to the site of an ancient Assyrian city situated in the angle formed by the rivers Tigris and Zab, and about 18 miles below Mosul. It is one of the group of great cities which clustered round Nineveh, the capital, and it has been supposed, from inscriptions found in the ruins, that it is identical with the Calah mentioned in Genesis x. See *Nineveh*.

Nine-pins, a game with nine pins or pieces of wood set on end, at which a ball is rolled for throwing them down. It has been replaced in the United States by a game called *Ten-pins*.

Nineveh (nin'ē-ve), an ancient ruined city, formerly capital of the Assyrian Empire, in Asiatic Turkey, and in the pashalic of Mosul, on the left bank of the Tigris, along which, and opposite to the town of Mosul, it occupied an extended site. The first recorded notice of Nineveh is in Genesis x. Again it is spoken of in the book of Jonah as a 'great city.' It remained the capital of Assyria till about 606 B.C., when it was taken and burned by the Babylonian Nabopolassar and the Median Cyaxares. It was maintained as a local tradition that this ancient capital of Assyria lay buried on the left bank of the Tigris opposite Mosul; but the fact was not definitely settled until in 1841 M. Botta began excavations in the vast mounds which there existed. He was followed in this by Mr. (afterwards Sir Henry) Layard, who explored a great portion of the large angle formed by the Tigris and the Zab. In the mounds of Koyunjik, opposite Mosul, he excavated the palaces of Sennacherib, Assurbanipal and Esarhaddon. The walls of the city, which the inscriptions describe as Ninua, stretch along the Tigris for 2½ miles, and the elaborate outworks, moats, and defenses can still be traced. The important discoveries made by Layard were continued by Loftus, Hormuzd Rassam and G. Smith, and the result of their labors deposited in the British Museum. See *Assyria*.

Ningpo (ning'pō'), a large city of China, in the province of Chekiang, one of the ports open to foreign commerce, on a plain on the left bank of the Takia or Ning-po River, about 16 miles from its mouth. It is surrounded by a wall 25 feet high, 15 feet wide, and 5 miles in circuit, and its most remarkable edifice is the great Ning-po pagoda, 160 feet in height, and now partly in ruins. The manufactures consist chiefly of silk and cotton goods, carpets, furniture, etc. The principal exports are tea, silk, and raw cotton; and the principal imports sugar and opium. Pop. est. from 400,000 to 500,000.

Ninian (nin'yan), St., a missionary preacher who spread Christianity among the Picts in the beginning of the fourth century. He was ordained bishop of the Southern Picts by Pope Siricius in 394. Ninian selected Candida Casa, or Whithorn (Wigtownshire), as his chief seat, but prosecuted his labors in all parts of Southern Scotland, and even as far north as the Grampians. He died in 432. His festival is September 16.

Ninon de L'Enclos. See *L'Enclos*.

Ninus (nī'nus), the fabulous founder of the Assyrian Empire, and of its capital, Nineveh. He is said to have married the similarly fabulous Semiramis, by whom he was afterwards murdered.

Niobē (nī'o-bē), in Greek mythology, the daughter of Tantalus, married to Amphion, king of Thebes. Proud of her numerous progeny, she provoked the anger of Apollo and Artemis (Diana), by boasting over their mother Leto (Latona), who had no other children but those two. She was punished by having all her children put to death by those two deities. She herself was metamorphosed by Zeus (Jupiter) into a stone which shed tears during the summer. This fable has afforded a subject for art, and has given rise to the beautiful group in the tribune at Florence, known by the name of Niobē and her Children.

Niobium (nī-ō'bi-um), or COLUMBIUM, a rare metal discovered in 1801, in a black mineral called columbite from North America. It forms a black powder insoluble in nitric acid, but readily soluble in a mixture of nitric and hydrofluoric acids. Symbol Nb. Atomic weight 98.

Niort (nī-ōr), a town in Western France, capital of the department of Deux-Sèvres, on two hills washed by the Sèvre-Niortaise, 79 miles south-east of Nantes. Its town house and old castle are interesting buildings. The staple manufactures are leather and gloves, and the trade, particularly in claret, is extensive. Pop. (1911) 23,775.

Nipa (nē'pa), a genus of palms of which there is but one species, *N. fruticans*, a native of the East Indies, Philippines, etc., growing on marshy coasts. It has no stem, fronds about 20 feet long, and edible fruits. The fronds

are used by the natives for a variety of purposes.

Niphon, or NIPON. See *Japan.*

Nipigon (nip'i-gon), or NEP'IGON, a lake of Canada, in Ontario, about 30 miles northwest of Lake Superior. It is about 70 miles long and 40 miles broad, with rugged headlands, deep bays, and many islands. It is connected with Lake Superior by the Nipigon river.

Nipissing (nip'i-sing), LAKE, a lake of Canada, in Ontario, N. E. of Lake Huron, irregular in coast line; breadth, about 30 miles; length, 48 miles. It contains many islands, its outlet being by French River into Lake Huron.

Nipple. See *Mammary Glands.*

Nipplewort (nip'l-wurt), a plant of the genus *Lapsana* (*L. communis*), nat. order Compositæ, growing commonly as a weed by the sides of ditches and in waste places.

Nirva'na. See *Buddhism.*

Nisami (ne-zä'mē), full name ABU MOHAMMED BEN JUSUF SHEIKH NISÂM-ED-DIN, one of the great poets of Persia, and the founder of the romantic epic, born about 1100, was a special favorite of the Seljuk princes, who then ruled in Persia; died in 1180. Besides a *Diran*, or collection of lyrics, he wrote five larger poems, which have been extensively circulated in Persia and India.

Nisan (nī'zan), a month of the Jewish calendar, the first month of the sacred year and seventh of the civil year, answering nearly to our March. It was originally called Abib, but began to be called Nisan after the captivity.

Nish (nēsh), or NISSA (nis'sa), a fortified town in Servia, on the Nishava, 130 miles S. E. of Belgrade. It is the seat of a Greek bishop, and has celebrated hot springs and baths. It was the native place of the Emperor Constantine the Great. Pop. (1900) 24,451.

Nishapur (nesh'ä-pŏr), an ancient city in Persia, province of Khorasan, 50 miles west by south of Mushed. Turquoises of excellent quality have long been found in its vicinity. Omar Khayyam was born here in 1123. Pop. about 15,000.

Nisibis (nis'i-bis), anciently a famous town in Mesopotamia, on the river Mygdonius. It is now called Nisibin, and is a small ruinous place.

Nisi prius (nī'si prī'us), a phrase in English law meaning 'unless before,' and occurring originally in a writ by which the sheriff of a county was commanded to bring the men impaneled as jurors in a civil action to the court at Westminster on a certain day, 'unless before' that day the justices came thither (that is, to the county in question) to hold the assizes, which they were always sure to do. The judges of assize, by virtue of their commission of *nisi prius*, try the civil causes thus appointed in their several circuits, being said to sit at *nisi prius*, and the courts in which these actions are tried being called courts of *nisi prius*, or *nisi prius* courts. A trial at *nisi prius* may be defined in general as a trial, before a judge and jury, of a civil action which has been brought in one of the superior courts. The phrase has been introduced, with the same meaning, in the United States courts.

Niter (nī'tėr) (KNO_3), a salt, called also saltpeter, and in the nomenclature of chemistry nitrate of potassium or potassic nitrate. It is produced by the action of microbes in soils containing potash and nitrogenous organic matters, and forms an efflorescence upon the surface in several parts of the world, and especially in the East Indies, whence much niter is derived. In some parts of Europe it is prepared artificially from a mixture of common mold or porous calcareous earth with animal and vegetable remains containing nitrogen. It is also manufactured on a large scale by crystallization from a hot solution of chloride of potassium and nitrate of soda. It is a colorless salt with a saline taste, and crystallizes in six-sided prisms. It is employed in chemistry as an oxidizing agent and in the formation of nitric acid. Its chief use in the arts is in the making of gunpowder. It also enters into the composition of fluxes, and is extensively employed in metallurgy; it is used in the art of dyeing, and is much employed in the preservation of meat and animal matters in general. In medicine it is prescribed as cooling, febrifuge and diuretic.

Nitrate of Silver, a substance obtained by cooling, in the shape of tabular crystals, from the solution produced when silver is oxidized and dissolved by nitric acid diluted with two or three times its weight of water. When fused the nitrate is of a black color, and it may be cast into small sticks in a mold; these sticks form the *lunar caustic* employed by surgeons as a cautery. It is sometimes employed for giving a black color to the hair, and is the basis of the indelible ink for marking linen. Its solution is always kept in the laboratory as a test for chlorine and hydrochloric acid.

Nitrate of Soda. Called also Nitrate (nī'trāte). Chemical formula $NaNO_3$. A white crystalline salt formed by the action of nitric acid on the metal sodium. It is very soluble in water and deliquesces readily in moist air. It is found in nature in large beds in Northern Chile, where it is known as Chile Saltpetre or Cubic Nitre. The largest beds are in the provinces of Tarapaca and Antofagasta along the rainless western slope of the Andes Mtns., covering an area 2 to 3 miles wide and 200 miles long. They formerly belonged to Peru, but were obtained by Chile through conquest in 1881. Its origin is still in doubt. These beds yield from 20% to 50% nitrate of soda. Before the war Chile exported yearly about 1,500,000 tons of nitrate to all parts of the world, almost half of which went to Germany. The export duty netted the Chilean Government an enormous revenue. These natural deposits were discovered by Taddeo Haenke in 1809 and although fifty million tons have been shipped from the west coast of South America since 1830 an abundance still remains. Every year the amount exported has increased until during the war it reached 2,500,000 tons. The crude deposit has the appearance of sandstone varying in color from light yellow to light brown and of various degrees of hardness. It contains impurities of sodium chloride, sulphate and iodide, besides appreciable amounts of lime and nitrate of potash. It is refined to about 90% purity by crystallization. The iodine and potash are extracted from the nitrate and furnish a large supply of these articles. The deposits of nitrate are kown as 'caliche' and occur in beds from a few inches to several feet under the surface. These beds vary in thickness from two to six feet. The overburden which must be removed to reach these beds consists of a layer of sand 6 to 12 inches deep and the remaining depth a hard rock-like subsoil. As the beds occur in patches considerable prospecting is necessary to locate them. This prospecting consists of sinking holes at intervals to determine the amount of caliche, its quality and the depth. The caliche is mined either by removing the entire overburden and breaking up the bed by blasting, or by drilling an 8″ hole down through to the bottom of the bed and blasting with blasting powder. The broken ore is sorted out and the overburden shoveled back into the pit. The caliche is drawn by mule teams or tram cars to the crusher bins at the refining plant. The crushed ore is boiled in large tanks 9′ deep, 8′ wide and 32′ long until the nitrate of soda is dissolved out. The nitrate liquor is then cooled in shallow tanks, and transparent, colorless obtuse-angled rhombohedra crystals of nitrate of soda are formed. When dried the nitrate is transported by rail to the coast, loaded into lighters and transferred to ships.

The chief uses of nitrate of soda are for agricultural purposes, making nitric acid and explosives. It is the widest used of the commercial fertilizers for supplying nitrogen to soil, and is furnished to the trade alone or mixed with phosphates and potash. It contains between 18% and 20% of nitrogen quickly available as plant food, and is used extensively for corn crops, root crops and as a top dressing on grass lands. Owing to its solubility it quickly leaches out. The value of nitrate of soda for the soil is shown by the fact that in 1880 Germany imported 55,000 tons of nitrate and raised 19 bushels of wheat per acre. In 1913 they imported 747,000 tons and raised 35 bushels per acre. Experiment has shown that the wheat yield on a soil poor in nitrogen can be raised from 35 bushels to 116 bushels by adding a nitrogenous manure. The United States uses an average of 28 pounds of fertilizer per acre and raises 113 bushels of potatoes, while Germany uses 200 pounds per acre and raises 223 bushels of potatoes. The addition of nitrate to a soil has increased the yield of potatoes from 74 bushels to 287 bushels.

Nitric acid is made from nitrate of soda by distillation with sulphuric acid. Nitrate of soda is also used extensively as an ingredient of blasting powder and dynamite. The U. S. Dept. of Agriculture on Sept. 12, 1914, issued permission to use refined nitrate of soda for curing meats. For this purpose it is refined to 99% purity. It is not, however, used as extensively for this purpose as nitrate of potassium. It is also used to a small extent in glass works, in drugs, by chemical manufacturers for making various chemicals and as a reagent in analytical chemistry. Chemically pure nitrate of soda is not as deliquescent as the refined product. 100 grams of water will dissolve 72.9 grams of nitrate of soda at 0° C. and 180 grams at 100° C. A saturated solution boils at 120° C. The salt fuses at a temperature of 316° C.

During the war the demand for nitrate of soda exceeded the available supply, therefore attention was turned to the fixation of atmospheric nitrogen in order to get sufficient nitric acid to meet the de-

mands. In 1917 about 60% of the inorganic nitrogen consumed in the United States was from Chilean nitrate, about 30% from by-product coke-oven ammonia and about 10% from the cyanamide process of fixing nitrogen. In 1916 the Government appropriated twenty million dollars for the production of nitrates for manufacturing munitions and fertilizers. Five plants were started but none operated before the armistice was signed. The largest of these plants was located at Muscle Shoals, Alabama, just above Florence on the Tennessee River and was to have a yearly capacity of 110,000 tons of ammonium nitrate. The cyanamide process was the one used. Power is obtained from a large government hydroelectric plant on the Tennessee River. Twenty-four towers are used to liquefy the air and separate the oxygen and nitrogen gases. Each tower can produce 1765 cubic feet of nitrogen per hour. The nitrogen is run into the lime-nitrogen ovens containing heated calcium carbide where calcium cyanamid is formed. This product is treated with superheated steam under high pressure which breaks it up into ammonia. The ammonia is mixed with air and passed through a platinum wire gauze heated to incandescence which converts the ammonia into oxides of nitrogen. These are dissolved in water to form nitric acid. At present the Government is negotiating for the lease of this plant to private capital for the manufacture of commercial fertilizers. *See also Nitrogen, Nitrification,* etc.

Nitric Acid (nī'trik), (HNO_3), the most important of the five compounds formed by oxygen with nitrogen. When pure it is a colorless liquid, very strong and disagreeable to the smell, and so acrid that it cannot be safely tasted without being much diluted. It is known in the arts as *aqua fortis*, and is commonly obtained by distilling niter (potassium nitrate) or Chile saltpeter (sodium nitrate) with strong sulphuric acid. Nitric acid contains about 76 per cent. of oxygen, a great part of which it readily gives up to other substances, acting thus as a powerful oxidizer. Thus many metals—such as copper, tin, silver, etc.—when brought into contact with this acid are oxidized at the expense of the acid with the production of lower oxides of nitrogen and an oxygenated metallic salt. Nitric acid, when moderately dilute, acts on organic bodies so as to produce a series of most useful substances, notably acetic, oxalic and picric acids, isatin or white indigo, etc. When strong acid is used, nitro-compounds oftentimes result, containing the group NO_2 in place of part of the hydrogen of the original substance; thus we get *nitrophenol, nitrobenzol,* etc. By replacement of the hydrogen in nitric acid a series of salts termed *nitrates* is obtained. (See *Nitrate.*) When nitrates are heated with combustible bodies an explosion is generally produced. A mixture of strong hydrochloric and nitric acids is known as *aqua regia, nitromuriatic,* or *nitrohydrochloric acid.* Nitric acid is employed in etching on steel or copper; as a solvent of tin to form with that metal a mordant for some of the finest dyes; in metallurgy and assaying; also in medicine, in a diluted state, as a tonic and as a substitute for mercurial preparations in syphilis and affections of the liver; and also in form of vapor to destroy contagion.

Nitrides (nī'trīdz), a general designation for the compounds of nitrogen with other elements or radicles, but more especially for those compounds which nitrogen forms with phosphorus, boron, silicon and the metals.

Nitrification (nī-tri-fī-kā'shun), the conversion of nitrogenous organic matter or compounds of ammonia into nitrates, thus bringing them into a condition suitable for plant assimilation. Aside from this chemical method of nitrification, there is abundant reason to believe that the nitrogen of the air directly undergoes a similar change, especially in view of the fact that plants take up more nitrogen than the soil seems capable of furnishing. Recent research has shown that nitrogen may be fixed in the soil by the action of certain micro-organisms which occur in considerable variety and in great abundance, and which also occur as parasites on the roots of leguminous plants. For this reason the growth of plants of this family—peas, clover, alfalfa, etc., enrich instead of depleting the soil. Various methods are now employed by the aid of electric power to produce nitrates fitted for plant food and with a promising cheapness. Also nitrifying bacteria are cultivated in great numbers and supplied to farmers in condition to sow in the soil. These methods are very promising for the future of agriculture.

Nitrites. See *Nitrogen.*

Nitro-benzol ($C_6H_5NO_2$), a liquid prepared by adding benzol drop by drop to fuming nitric acid. It closely resembles oil of bitter almonds in flavor, and is largely employed as a substitute for that oil in the manufacture

of confectionery and in the preparation of perfumery. It is important as a source of aniline.

Nitro-compounds, compounds of carbon which are formed from others by the substitution of the monatomic radicle NO_2 for hydrogen.

Nitrogen (nī'tru-gen), an important elementary principle, the basis of nitric acid and the principal ingredient of atmospheric air. Its symbol is N, its equivalent 14, and its specific gravity 0.9713. It is a colorless, invisible gas, called by Lavoisier *azote* (Greek, *a*, privative, *zōē*, life), because it is incapable of supporting life. The name nitrogen was applied to it by Chaptal, because of its entering into the composition of niter, nitric acid, etc. The atmosphere contains about four-fifths of its volume of nitrogen, the rest being principally oxygen; niter contains nearly 13 per cent., and nitric acid about 22 per cent. by weight of this substance. Nitrogen is inodorous, tasteless, incombustible, and a very inert substance in itself, although many of its compounds, such as nitric acid and ammonia, are possessed of great chemical activity. By reason of its inertness and general slowness of chemical action it acts the part of a diluent of oxygen in the atmosphere. Having no marked action of its own on living beings, its admixture with the oxygen of the air serves to moderate the otherwise too violent action of the latter gas. Under certain circumstances nitrogen may be induced to combine with other elements, especially with hydrogen, oxygen, and carbon, with titanium, tantalum and tungsten. Nitrogen is allied in many of its chemical properties to the other elementary substances—phosphorus, arsenic, antimony and bismuth; and it has the power of combining with one, three, or five atoms of a monovalent element or radicle. The oxides of nitrogen are five in number. The first oxide of nitrogen (nitrogen *monoxide*) contains 28 parts by weight of nitrogen united with 16 parts by weight of oxygen; its chemical formula is N_2O. The next oxide (*dioxide*) contains 28 parts by weight of nitrogen united with 32 parts by weight of oxygen; its formula is N_2O_2. In the third oxide (*trioxide*) 28 parts of nitrogen is united with 48 parts of oxygen, and to it the formula N_2O_3 is assigned; while the fourth and fifth oxides (*tetroxide*, *pentoxide*) contain respectively 64 and 80 parts of oxygen, united in each case with 28 of nitrogen; to these the formulæ N_2O_4 and N_2O_5 are given. These oxides may be all produced from nitric acid. The *trioxide* forms a dark-blue liquid, which, when added to water at 0°, combines therewith, forming *nitrous acid*, HNO_2. This solution acts as a reducing agent, inasmuch as it eliminates gold and mercury as metals from several of their salts; on the other hand, it also exercises an oxidizing action on such salts as ferrous sulphate, potassium iodide, etc. By replacement of the hydrogen in nitrous acid a series of metallic salts is obtained, called *nitrites*. Nitrogen monoxide is better known by the name of 'laughing gas,' from the peculiarly exhilarating effect which it produces when breathed along with a little air. If the gas be pure, its inspiration soon brings about total insensibility, which does not continue long, and generally produces no bad effects upon the person who breathes it; hence it is much used as an anæsthetic in minor surgical operations, such as teeth drawing, etc.

Nitro-glycerine (nī'trō glis'ēr-in), an explosive substance appearing as a colorless or yellowish oily liquid, heavier than and insoluble in water, but dissolved by alcohol, ether, etc. It may be prepared by adding to 350 parts by weight of glycerine 2800 parts by weight of a cooled mixture of 3 parts of sulphuric acid of 1.845 specific gravity and 1 part of fuming nitric acid. The liquid is poured into ten or twenty times its bulk of cold water, when the heavy nitro-glycerine sinks to the bottom. When violently struck nitro-glycerine explodes, being resolved into water, carbonic acid, nitrogen oxides, and nitrogen. The volume of gas produced is about 10,000 times the initial volume of the nitro-glycerine. Explosion can also be effected by heating to about 500° F. one portion of a mass, whereby a partial decomposition is produced which almost immediately propagates itself throughout the liquid. The explosive force of nitro-glycerine compared with that of an equal volume of gunpowder is as 13:1. If any traces of acid be allowed to remain in nitro-glycerine it is liable to undergo spontaneous explosion; hence it is an exceedingly dangerous article to transport or store under such conditions. It is advisable to prepare the substance on the spot where it is to be used, and only in such quantities as may be required for immediate consumption. This method is adopted in many quarries and engineering undertakings, especially in America. Nitro-glycerine is largely used in the form of *dynamite*, to produce which it is mixed with some light absorbent substance. Thus treated it becomes much less dangerous. See *Dynamite*.

Nitromuriatic Acid. See *Nitric Acid.*

Nitron (nī'tron), radium emanation. This name was given to the emanation by Sir William Ramsay and Dr. Gray, who regard it as a new gaseous element.

Nitrous Acid. See *Nitrogen.*

Nitrous Oxide. See *Nitrogen.*

Niuchwang. See *Newchwang.*

Nivelles (ni-vell; Flemish, *Nyvel*), a town of Belgium, province of Brabant, on the Thines, 18 miles south of Brussels, which has manufactures of woolen, cotton, linen and paper, as well as railway locomotive and car works. The church of St. Gertrude is an edifice in the Romanesque style. Pop. 12,109.

Nivernais (ni-ver-nā), formerly one of the provinces of France, corresponding nearly to the present department of Nièvre.

Nivose (nē-vōz; literally 'snow month'), the name given in the French revolutionary calendar to a winter month beginning December 21 and ending January 19.

Nix, or NIXIE, in German popular mythology, the name of water spirits (male and female), haunting rivers, brooks, ponds and lakes. The male nixie is sometimes represented as old, sometimes as young, but generally as a malicious being. The female nixie appears as a blooming maiden, who often falls in love with some young man, whom she entices or draws into the water.

Nixdorf (niks'dorf), a town in northern Bohemia, with manufactures of cutlery, tools, and other steel wares, fancy goods, etc. Pop. 7109.

Nizam (ni-zam'). in the East Indies, the title of the ruler of Hyderabad in the Deccan, derived from *Nizam-ul-mulk*, governor or regulator of th State, a name adopted by Azof Jah in 1719, and since that time adopted by his successors.

Nizam's Dominions. See *Hyderabad.*

Nizza. See *Nice.*

Noah (nō'a), one of the patriarchs of the Old Testament, son of Lamech, is described in the book of Genesis as being chosen by God for his piety to be the father of the new race of men which should people the earth after the deluge. Having been warned by God of the coming flood, he built a vessel (the *ark*) by His direction, and entered it with his family and all kinds of animals. (See *Deluge.*) After the waters had subsided the ark rested on Mount Ararat, where Noah offered a thank-offering to God, and was assured that the earth should never again be destroyed by a flood, as a sign whereof God set the rainbow in the clouds. Noah is said to have died at the age of 950 years, 350 years after the flood. While modern accounts place Mount Ararat in Armenia, older traditions locate it in the mountains of the Kurds, east of the Tigris.

Nobel (nō'bel), ALFRED, a Swedish inventor, born at Stockholm in 1833; died in 1896. His father was a manufacturer of nitro-glycerine, by experimenting with which the son discovered the art of making dynamite (*q. v.*). He also invented smokeless powder and several kinds of blasting powder. His inventions brought him great wealth, and by will he left a sum of over $9,000,000, the income of which was to be divided into five parts and annually awarded for the most important discoveries in physics, chemistry, and physiology or medicine; for the most remarkable idealistic literary work, and for the greatest service rendered to the cause of peace during the year. The annual distribution of these prizes among those most distinguished in these fields of effort has become an important event. Each prize amounts to about $40,000. Up till 1914, when the great war began, not a single German had gained the Nobel peace prize. Prizes were awarded two Americans (Roosevelt and Root), three Swiss, two Austrians, two Belgians, and one each from England, France, Denmark, Holland, and other countries exclusive of Germany. In literature, four prizes went to Germans, two to Frenchmen, and one each to writers from Norway, Spain, Poland, Italy, England, Sweden, Belgium, and Bengal. In medicine, again four prizes were awarded to Germans. Frenchmen gained three, and one each was awarded to America, Denmark, Russia, Spain. Switzerland, Sweden. In chemistry, six prizes went to Germany, four to France, two to England, one to Sweden, one to Switzerland, and none to America. In physics, four prizes went to Germany, three to the Netherlands, two to France, two to England, one to America, one to Sweden, and one to Italy.

Nobert's Test-plates, finely-ruled glass plates so named from F. Nobert, a German optician, used for testing the power of microscopes. The rulings are executed on the under surface of a piece of exceedingly thin glass by means of a diamond

point. Some of these ruled plates have the almost incredible number of 225,187 spaces to the inch.

Nobility (nō-bil'i-ti), a rank or class of society which possesses hereditary honors and privileges above the rest of the citizens. Such a class is found in the infancy of almost every nation. Its origin may be attributed to military supremacy; to the honors paid to superior ability, or to the guardians of the mysteries of religion. Among the ancient Romans the patricians originally formed the nobility; but a new order of nobility arose out of the plebeians, consisting of those who had held curule magistracies and their descendants, enjoying the right of having images of their distinguished ancestors. Among the ancient German tribes only obscure traces of hereditary nobility are found. The dignities of the counts of the Franks, the aldermen and great *thanes* of England, as also of the *jarls* (in England *eorlas*) of Denmark, were accessible to every one distinguished by merit and favored by fortune. In Venice a civic nobility grew up consisting of a series of families who gradually acquired all political power and kept it to themselves and their descendants. In England hereditary nobility, the nobility belonging to the titles of duke, marquis, earl, viscount and baron, is now entirely personal, though formerly, as a result of the Norman conquest, it was connected with the holding of lands. In Spain and Italy the same rank depends in greater measure upon property; and in France and Germany the *de* and *von* of titles points to the same fact. In France and Germany nobility is common to all the members of the noble family, and the German nobility form a very exclusive caste. In France and Germany the nobles long formed a class of petty sovereigns within their own domains. The French revolution first deprived the nobles of that country of their privileges and exclusive rights, as that of jurisdiction, etc.; and the decree of June 19, 1790, abolished hereditary rank entirely. Under Napoleon I arose a new hereditary nobility, with the titles of princes, dukes, counts, barons and chevaliers, which descended to the eldest son. After the restoration of the Bourbons (1814) the ancient nobility reclaimed their former rights and privileges. Nobility was again abolished in 1848, but was restored by Napoleon III. In Norway the parliament abolished nobility by the three successive decrees of 1815, 1818 and 1821. In Great Britain titles of nobility can only be conferred by the sovereign, and that by patent, in virtue of which they become hereditary. Life peerages also are occasionally conferred. The nobility, as the term is commonly used, consists of those holding the titles already mentioned (or all above the rank of baronet) and their more immediate connections; but if the term were to be used as generally in Europe the gentry would also be included, or all families entitled to bear coat-armor. Those of the nobility who are peers of England, of Great Britain, or of the United Kingdom, have a hereditary seat in the House of Lords, while the Scottish peers elect sixteen of their number to represent their order, and the Irish peers elect twenty-eight representatives for the same purpose. See also *Britain* (sections *Parliament* and *Ranks* and *Titles*) and *Peer*. The institution of nobility has never been introduced into the United States or any of the other American republics.

Noble (nō'bl), an ancient English gold coin, value six shillings and eightpence, first struck in the reign of Edward III, 1344. The noble having increased in value to 10*s*., a coin of the former value of a noble was issued by

Noble of Edward III. A, Actual diameter of the coin.

Henry VI and Edward IV, and called an *Angel* (which see). Half-nobles and quarter-nobles were also in circulation at the same period.

Noblesville, a city, capital of Hamilton County, Indiana, on the White River, 22 miles N. N. E. of Indianapolis. It has manufactures of iron, strawboard, carriages, carbon works and flour mills, etc. Pop. (1920) 4758.

Nocera (nō-chā'rà), a cathedral city of South Italy, province Salerno. It carries on cotton spinning and weaving. Pop. 22,368.

Noctiluca (nok-ti-lū'ka), a minute genus of marine animals placed among the Infusoria or the Rhizopoda, which in size and appearance much resemble a grain of boiled sago, or a little granule of jelly, with a long stalk. These minute animals are phosphorescent; and the luminosity which appears on the surface of the sea during the night is chiefly due to them.

Nocturne (nok-tėrn'), in painting, a nightpiece; a painting exhibiting some of the characteristic effects of night light. In music, a composition in which the emotions, particularly those of love and tenderness, are developed. It has become a favorite style of composition with modern pianoforte composers.

Noddy (nod'i; *Anous stolidus*), a seabird of the family Laridæ (gulls), widely diffused through the northern and southern hemispheres, and well known to sailors for its fearlessness or stupidity, allowing itself even to be taken by the hand; hence its name. The noddy is very abundant in warmer climates, as in the West Indies. There are several other species differing somewhat in details from *A. stolidus*.

Node (nōd), in astronomy, one of the points in which two great circles of the celestial sphere, such as the ecliptic and equator, the orbits of the planets and the ecliptic, intersect each other; and also one of the points in which the orbit of a satellite intersects the plane of the orbit of its primary. The node at which a heavenly body passes or appears to pass to the north of the plane of the orbit or great circle with which its own orbit or apparent orbit is compared is called the *ascending node;* that where it descends to the south is called the *descending node.* At the vernal equinox the sun is in its ascending node; at the autumnal equinox in its descending node. The straight line joining the nodes is called the *line of the nodes.* The *lunar nodes* are the points at which the orbit of the moon cuts the ecliptic.

Node, in physics, a point in a vibrating body, or system of vibrating particles, where there is no movement. When a body is vibrating, the vibratory motion is conveyed from one place to another by the action of the molecular forces of the particles on one another. Now when all the forces acting on a certain particle are at any instant in equilibrium, and the particle consequently remains at rest, there is said to be a *node* at the particle. If a plate of glass or metal be held in the hand, and a bow be drawn across the edge, particles of fine sand, previously placed on the plate, will arrange themselves in lines, along which it is evident no vibration has taken place. These lines, called *nodal lines,* generally form geometrical figures.

Nodier (nod-i-ā), CHARLES, a versatile French writer, born in 1780; died in 1844. At first a republican, then an ardent royalist, he lived an adventurous life till 1824, when he became librarian to the Bibliothèque de l'Arsenal. He wrote tales, romances, satires, dictionaries, travels, works on entomology, etc., and was a friend of all the literary men of the time, and had a certain influence on the Romantic school of French authors, including Hugo, Dumas, etc.

Nodosaria (nō-do-sā'ri-a), a genus of fossil foraminifers, having a shell composed of numerous chambers arranged in a straight line. They occur in chalk, tertiary, and recent formations.

Nogales (nō-gā'les), county seat of Santa Cruz Co., Arizona, on the international boundary between the United States and Mexico. It is a port of entry. Exports through Nogales in 1920 were $13,600,000; imports, $25,000,000. Tumacacori Mission, built in 1700, is near by. Pop. 5199.

Nogent-sur-Marne, a suburban village of Paris on the Marne, a little to the east of the capital. Pop. (1906) 11,463.

Nogi, a Japanese soldier, born in 1842. He took part in the revolution of 1868, in the suppression of the Satsuma rebellion of 1877, in the war with China, 1894-95, and was afterwards governor of Formosa. In the war with Russia he commanded the army that captured Port Arthur. On September 13, 1912, in accordance with an ancient Japanese custom, General Nogi and his wife died by their own hands in final tribute to the dead emperor, Mutsuhito.

Noirmoutier (nwâr-mō-tyā), an island of Northwestern France, separated from the coast of Vendée by a narrow and shallow channel. It is about 10 miles long, with a breadth varying from 1 to 3 miles, and is generally fertile. Pop. (1906) 8388. The chief town, of the same name, has good anchorage and a productive oyster fishery. Pop. 2085.

Noisseville (nwâs-vēl), a village of German Lorraine to the east of Metz, the scene of a fiercely contested battle during the Franco-German war, 1870, between the forces of Prince Frederick Charles and those of Marshal Bazaine.

Nola (nō'lā), a town of Southern Italy, and a bishop's see, near Naples, in Caserta, said to have been built by the Etrurians before Rome. Pop. 14,900.

Noli-me-tangere (Lat. 'touch me not'), the name of a plant. See *Impatiens.*

Nollekens (nol'e-kenz), JOSEPH, an English sculptor, son of an Antwerp painter, born in London in 1737; died in 1823. He was placed early under Scheemakers, and in 1759 and

1760 gained premiums from the Society of Arts. Going subsequently to Rome, he had the honor of receiving a gold medal from the Academy of Painting and Sculpture. On his return to England in 1770 he was elected an Associate of the Royal Academy (1771) and a Royal Academician (1772). His *Venus with the Sandal* is his principal ideal production; but his professional reputation rests mainly upon his portrait busts.

Nolle Prosequi (nol'le pros'e-kwī; Lat. 'to be unwilling to prosecute'), in law, a stoppage of proceedings by a plaintiff, an acknowledgment that he has no cause of action.

Nomads (nom'adz), tribes without fixed habitations, generally engaged in the tending and raising of cattle, and changing their abode as necessity requires or inclination prompts. North Africa, the interior of North and South America, and the northern and middle parts of Asia, are still inhabited by nomadic tribes, who are bandits and robbers.

Nome (nōm), the largest city in Alaska, situated in the Northern district, on the coast of Bering Sea, and in an important gold-producing area. Pop. (1910) 2600.

Nominalism (nom'i-nal-izm), the doctrines of those scholastic philosophers who followed John Roscellin, canon of Compiègne in the eleventh century, in maintaining that general notions (such as the notion of a tree) have no realities corresponding to them, and have no existence but as names (*nomina*) or words. They were opposed by the *realists*, who maintained that general ideas are not formed by the understanding, but have a real existence independent of the mind and apart from the individual object. During the twelfth century the controversy between the nominalists and the realists was carried on with great keenness, and in the beginning of the fourteenth the dispute was revived by the English Franciscan William of Occam, a disciple of the famous Duns Scotus. The controversy, long continued, gave rise to actual persecution.

Non-activity. See *Neutrality*.

Non-commissioned Officer, one who, while he is not commissioned as an officer, holds an appointment by virtue of which he exercises authority over the private soldiers. Such are sergeant-majors, quartermaster-sergeants and sergeants.

Non Compos Mentis ('not of sound mind'), an expression used of a person who is not of sound understanding, and therefore not legally responsible for his acts.

Nonconformists (non-kon-form'-istz), those who refuse to conform to an established church. The name was first applied to those English clergymen who, at the Restoration, refused to subscribe to the Act of Uniformity, and were in consequence ejected from their livings. Relief was afforded by the Toleration Act of 1689. The repeal of the Corporation and Test Acts in 1828 removed the civil disabilities under which Nonconformists had previously been placed, and religious tests at the universities were abolished in 1871 and 1873. See *England* (*Ecclesiastical History*).

Non-effective, the term applied in military language to designate that portion of the forces not in active service or not in a condition to proceed to active service, such as retired officers, pensioners, and the like.

Nones (nōnz), (1) in the Roman calendar, the fifth day of the months January, February, April, June, August, September, November and December, and the seventh day of March, May, July and October. The *nones* were so called as falling on the *ninth* day before the ides, both days included. (2) The office for the ninth hour, one of the breviary offices of the Roman Catholic Church.

Nonjurors (non-jö'rerz), those who refused to take the oath of allegiance to the government and crown of England at the Revolution, when James II abandoned the throne. See *England* (*Ecclesiastical History*).

Nonnus (non'us), or NONNOS, a later Greek poet, born at Panopolis, in Egypt, who lived about the beginning of the fifth century A.D. He is the author of a poem entitled *Dionysiaca*, in forty-eight books, in which the expedition of Bacchus (Dionysius) to India is described; also of a paraphrase, in Greek hexameters, of the Gospel of St. John.

Non-residence, failure or neglect of residing where official duties require one to reside, or on one's own lands; especially residence by clergymen away from their cures. A beneficed clergyman of the English Church absenting himself without license from his bishop for more than three months in any year is liable to forfeit part of his emoluments.

Non-resistance, submission to authority, power, or usurpation without opposition. This used to be inculcated by the believers in the

doctrine of the divine right (which see) of kings.

Nonsuit (non'sūt), a term in law. When a person has commenced an action, and at the trial fails in his evidence to support it, or has brought a wrong action, he is nonsuited. A nonsuited plaintiff may afterwards bring another action for the same cause, which he cannot do after a verdict against him.

Nootka (nōt'ka), an island of Canada on the west coast of Vancouver Island, at the entrance of Nootka Sound, an inlet running about 10 miles inland.

Nootka-dog, a large variety of dog domesticated by the Indians of Nootka Sound, chiefly remarkable for its long wool-like hair, which when shorn off holds together like a fleece, and is made into garments.

Noraghe (no-rā'gā). See *Nuraghi.*

Nord (nōr), a department in the northeast of France, bordering with Belgium; area, 2170 square miles. The coast, marked by a long chain of sandy hillocks, furnishes the two harbors of Dunkirk and Gravelines. The interior is a monotonous but fertile alluvial flat, intersected by sluggish streams and canals. The husbandry, nearly akin to that of Flanders, is careful, skilful and productive. The principal minerals are coal and iron, which are extensively mined; and the occupations connected with or depending on them render this department among the most important in France. The capital is Lille. Pop. 1,895,861.

Nordau (nor'dą), MAX SIMON, author, born of Jewish ancestry at Budapest, Hungary, in 1849. He became a physician, wrote works of travel, but became widely known by the pessimistic views of society and literature expressed in his *Conventional Lies of Society, Paradoxes and Degeneration.* In the latter he maintained that much in contemporary life and literature is evidence of physical and mental degeneration. He also wrote dramas, poems and novels.

Norden (nōr'den), a seaport of Prussia, in Hanover, 16 miles north of Emden, on a canal which at a short distance communicates with the sea. Pop. (1905) 6717.

Nordenfeldt (nor'den-felt), a Swedish engineer, born in 1844, the inventor of a machine-gun which bears his name, also of several torpedoes and a submarine boat.

Nordenskiöld (nor'den-sheuld), NILS ADOLF ERIK, BARON, a Swedish naturalist and explorer, born at Helsingsfors in 1832. He devoted himself to science, and was appointed to some important posts, but becoming obnoxious to the Russian authorities he settled in Sweden. In 1851 he went with an expedition to Spitzbergen, to which he several times returned, assisting in the measurement of an arc of the meridian and mapping the southern part of Spitzbergen. On a North Polar expedition in 1868 Nordenskiöld reached the high lati-

Baron Nordenskiöld.

tude of 81° 42′. Having turned his attention to Siberia, after making two successful voyages through the Kara Sea to the Yenissei, he decided to attempt the accomplishment of the northeast passage, or passage by sea round Northern Asia to the Pacific. Aided by the King of Sweden and others, Nordenskiöld was enabled, July, 1878, to sail in the *Vega,* and succeeded in his project, his vessel doubling the most northern point of the Old World, Cape Tchelyuskin. After passing through Bering Strait it reached Japan, September 2, 1879. The object of the expedition being thus accomplished, Nordenskiöld was enthusiastically welcomed in Europe and created a baron by the King of Sweden. He published reports of his several voyages and died in 1901.

Norderney (nor'der-nī), a small island belonging to Prussia, on the coast of East Friesland, reachable on foot at low tide; area, about 5 square miles; pop. 3888, chiefly fishermen of the old Frisian stock. At the southwest end of the island is a village famous as a seabathing place throughout Germany, and visited annually by some 13,000 persons.

Nordhausen (nord'hou-zn), a town in Prussian Saxony, 38 miles N. N. W. of Erfurt, pleasantly sit-

nated at the foot of the Harz Mountains. It has a Roman Catholic cathedral, a fine late Gothic edifice with a Romanesque crypt, an old town hall, etc. It manufactures leather, tobacco, carpets, cotton and linen cloth, chemicals, etc., and has extensive distilleries and breweries. Pop. (1910) 32,564.

Nordica (Norton) (nōr'di-ka), LILIAN, American soprano singer, born at Farmingham, Maine, May 12, 1859; died May 10, 1914. She studied music in Boston, and afterward in Milan. Her greatest successes were achieved in Wagnerian opera, and she sang at Bayreuth in 1894.

Nördlingen (neurd'ling-ĕn), a walled town of Bavaria, near the Würtemberg frontier, with well-preserved walls and towers, and a handsome Gothic church, surmounted by a remarkable tower 290 feet high. The Swedes were defeated here September 6, 1634. (See *Thirty Years' War.*) Pop. (1905) 8512.

Nore (nōr), (1) A part of the estuary of the Thames, about 50 miles below London, and east of Sheerness, encumbered with sandbanks, on one of which is a floating light.—(2) A river of Ireland, rising in the Slieve Bloom Mountains, on the borders of Tipperary and Queen's County, and joining the Barrow about 2 miles above New Ross; length 70 miles. It admits vessels of considerable size as far as Inistioge, and barges to Thomastown.

Norfolk (nōr'folk), a county of England, having the North Sea on the N. E. and the Wash on the N. W., its area 2044 sq. miles. The coast consists principally of cliffs, partly chalk and partly alternate strata of clay, gravel, loam and sand. These are gradually being undermined by the sea, which is in many places making inroads on the land. Considerable areas on the coast of the Wash, however, have been reclaimed from the sea. The Yare and its tributaries expand near the sea into meres or *broads*, which, largely covered with bulrushes and sedges, are the resort of a great variety of waterfowl. This county has a high reputation for its progress in agriculture. The crop raised in greatest perfection is barley. Most of it is made into malt, and then sent elsewhere. The manufactures consist chiefly of woven goods. Norfolk has extensive fisheries of both herrings and mackerel, the former being the most important. The county town, Norwich; the chief seaport is Yarmouth. Pop. (1911) 488,630.

Norfolk, a city and port in the county of the same name, Virginia, on the Elizabeth River, 32 miles from the ocean. It is 83 miles S. E. of Richmond, and is next to it in size among the cities of Virginia. In connection with Portsmouth it is the most important naval station in the United States, and has a large, safe and easily accessible harbor, admitting vessels of the largest class. The entrance to it is defended by Fortress Monroe. It is one of the chief coaling stations of the world, and has a large shipping trade in cotton, grain, early fruits and vegetables, peanuts, oysters, etc. There are various manufactures and ship and boat yards. At the outbreak of the Civil war it was the chief naval station of the Confederate States. Pop. (1910) 67,452; (1920) 115,777.

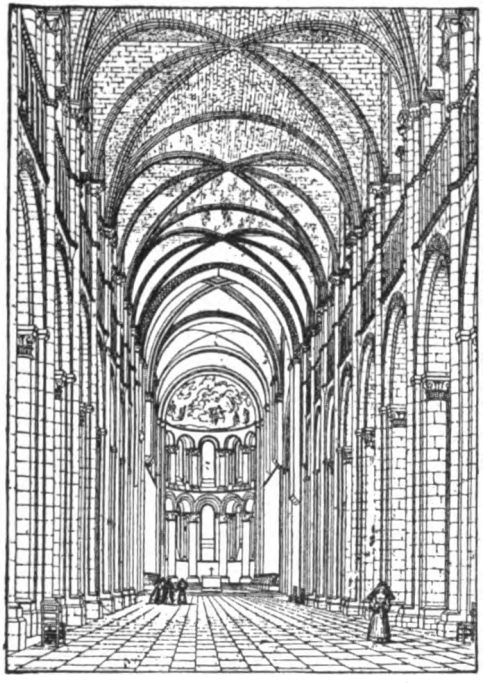
Norfolk, a city in Madison Co., Nebraska, on the north branch of Elkhorn River; an important railroad and jobbing center. It has grain elevators, cereal mills, canning factories, railroad shops, etc. Pop. (1920) 8634.

Norfolk-crag, in geology, an English tertiary formation belonging to the older Pliocene, resting on the chalk and London-clay. It consists of irregular beds of ferruginous sand-clay, mixed with marine shells, and mastodon and elephant remains have been discovered.

Norfolk Island, an island in the South Pacific, about 800 miles east of New South Wales, with which it is governmentally connected, is about 6 miles long by 4 broad, and has a fertile soil and salubrious climate, readily producing sweet potatoes, various tropical fruits, wheat, maize, etc. The coasts are precipitous and there is no good landing place. At one point it rises to the height of 1050 feet. The Norfolk Island pine grows to a great size, but is now comparatively scarce. Discovered uninhabited by Captain Cook in 1774, it was long used as a penal settlement, with New South Wales, and in 1856 it was assigned to the Pitcairn Islanders for their residence. (See *Pitcairn Island.*) These descendants of the mutinous crew of the *Bounty* were long represented as a community living in almost primitive innocence and simplicity, but recent reports hardly bear out the rosy picture. Their numbers amounted in 1885 to 481, not including the members of the mission station founded in 1867 and carried on under the Bishop of Melanesia. This station is intended as a center from which Christianity may be propagated in the Pacific; it has a farm of 1000 acres and educates about 150 Polynesian boys and girls besides native pastors.

Norfolk Island Pine, a tree of the genus *Araucaria* (*A. excelsa*), nat. order Coniferæ, formerly abounding on Norfolk Island, where it attains a height of 200 feet or more, with a diameter of 10 or 11 feet. Its timber is valuable, being white, tough and close-grained. It is one of the most beautiful of trees. Though an *Araucaria* it is very unlike the common species (*A. imbricāta*).

Noria (nō'ri-a), a hydraulic machine used in Spain, Syria, Egypt, and other countries for raising water. It consists of a water-wheel with revolving buckets or earthen pitchers, like the Persian wheel, but its modes of construction and operation are various. As used in Egypt it is known as the *sakieh*. These machines are generally worked by animal power, though in some countries they are driven by the current of a stream acting on floats or paddles attached to the rim of the wheel. See *Alps*.



Norman Architecture—Abbaye aux Dames, Caen.

Noric Alps.

Noricum (nor'i-kum), the Roman name of a region that corresponded nearly to what is now Upper and Lower Austria and Styria.

Normal (nor'mal), in geometry, a perpendicular to a tangent line or plane at the point of contact.

Normal, a town of McClean Co., Illinois, 2 miles N. of Bloomington. Seat of State Normal University. Pop. (1920) 5143.

Normal Schools, called also TRAINING COLLEGES, schools in which teachers are instructed in the principles of their profession and trained in the practice of it. The name is derived from the French *écoles normales*, established at the close of the eighteenth century. These schools are now numerous in all countries that have a well-organized system of education.

Norman (nôr'man), a city, county seat of Cleveland Co., Oklahoma, 18 miles S. of Oklahoma, in a fruit and general farming region and has flour and cottonseed oil mills, etc. Seat of University of Oklahoma, and a State asylum. Pop. (1920) 5004.

Norman Architecture (nôr'man), the round arched style of architecture, a variety of the Romanesque, introduced at the Norman Conquest from France into Britain, where it prevailed till the end of the twelfth century. In its earlier stages it is plain and massive with but few moldings, and those principally confined to small features; as the style advanced greater lightness and enrichment were introduced, and some of the later examples are highly enriched. The chevron, billet, nail-head and lozenge moldings are distinctively characteristic of this style. The more specific characteristics of churches in this style are: cruciform plan with apse and apsidal chapels, the tower rising from the intersection of nave and transept; semicylindrical vaulting; the doorways, deeply recessed, with highly decorated moldings; the windows small, round-headed, placed high in the wall, and opening with a wide splay inside; piers massive, generally cylindrical or octagonal, and sometimes enriched with shafts; capitals cushion-shaped, some-

times plain, more frequently enriched; buttresses broad, with but small projection; walls frequently decorated by bands of arcades with single or interlacing arches. In course of time the arches began to assume the pointed character; the walls, etc., to be less massive; short pyramidal spires crown the towers; and altogether the style assumes a more delicate and refined character, passing gradually into the Early English. Besides ecclesiastical buildings, the Normans reared many castellated structures, the best remaining specimen of which is the Keep of the Tower of London. The Norman architects were not distinguished for science in construction. The walls of their buildings were of great thickness, and the piers supporting their arches were usually of immense girth, yet notwithstanding this massiveness their works frequently gave way. The Abbaye aux Hommes and the Abbaye aux Dames at Caen, Normandy, afford excellent examples of this style; as also parts of the cathedrals of Durham, Peterborough, Norwich and Canterbury, as well as many smaller churches.

Norman Conquest, in English history, the successful attempt made by William of Normandy in 1066 to secure the English crown from his rival Harold, son of Earl Godwin. See *England* (*History*).

Normandy (nôr'man-di), an ancient province in the north of France, now divided into the departments of Seine-Inférieure, Eure, Orne, Calvados and Manche. On the decline of the Roman Empire it was seized by the Franks, and afterwards, in the tenth century, wrested from them by the Normans or Northmen, from whom it received its name. (See *Northmen.*) Charles the Simple gave his sanction to the conquest made by the Normans, and Rollo, their chief, received the title of Duke of Normandy. William the Bastard, sixth in succession from Rollo, having become king of England in 1066, Normandy became annexed thereto. On the death of William it was separated from England and ruled by his son Robert, and was afterwards ruled by the kings of England until Philip Augustus wrested it from John and united it to France in 1203. Although several times invaded by the English it was finally recovered by the French in 1450. Normandy is one of the richest and most fertile parts of France.

Norman French, a dialect of old French which became the Anglo-Norman of England. It was the language of legal procedure in England till the time of Edward III, and is still used in several formal proceedings of state.

Normans (literally 'north-men'), the descendants of the Northmen who established themselves in Northern France, hence called Normandy. Besides the important place occupied in history by the Normans in Normandy and England, bands of Normans established themselves in S. Italy and Sicily, and Norman princes ruled there from the middle of the eleventh till the end of the twelfth century. See *Normandy* and *Northmen*, also *Guiscard.*

Normanton (nôr'man-tun), a township in the West Riding of Yorkshire, on the Calder, giving name to a parliamentary division of Yorkshire. Pop. 15,033.

Norns (nôrnz), in Scandinavian mythology, the three Fates, representing the *past*, the *present* and the *future*, whose decrees were irrevocable. They were represented as three young women, named respectively Urd, Verdandi and Skuld.

Norris (nor'is), EDWIN, an eminent English linguist, and one of the founders of Assyriology; born in 1795; died in 1872. For more than twenty-five years he was secretary to the Asiatic Society, and became a great authority on cuneiform writing. His great work is his *Assyrian Dictionary* (1868-72), which marks an epoch in cuneiform studies. The Celtic dialects also received a share of his attention.

Norris, FRANK, novelist, born at Chicago in 1870; died in 1902. He studied art in Paris and literature in the United States, and became a newspaper correspondent in South Africa and Cuba. His first novel, *Iberville* (1891) was a tale of old California. He first attracted attention by *McTeague* (1899) and *Lady Letty* (1900), but is chiefly known by his projected and partly written epic of the wheat: in three stories two of which were written, *The Octopus*, detailing the troubles of the wheat growers with the railroad monopoly, and *The Pit*, describing the struggles on the wheat exchange in Chicago. *The Wave* (unwritten) was to deal with the story of the wheat after reaching a famine-stricken community in Europe.

Norris, WILLIAM EDWARD, an English novelist, born in 1847, son of Sir William Norris, chief justice of Ceylon. He studied law, but never practiced, devoting himself instead to literature. He wrote numerous novels, among them *My Friend Jim*, *The Rogue*, *The Dancer in Yellow*, *The Fight for the Crown*, etc.

POLITICAL MAP
OF
NORTH AMERICA
SCALE OF MILES
0 100 200 400 600 800 1000
Hammond's Political Map of North America
Copyright by C.S.Hammond & Co.,N.Y.
120° 110° Longitude West 100° from Greenwich 90° 80° 18
ARCTIC OCEAN
PACIFIC OCEAN
ATLANTIC OCEAN
GULF OF MEXICO
CARIBBEAN SEA
HUDSON BAY
BAFFIN BAY
GREENLAND
ALASKA
DOMINION OF CANADA
UNITED STATES
MEXICO
CENTRAL AMERICA
SOUTH AMERICA
Long Strait
Pt.Barrow
Melville Sound
Great Slave L.
Great Bear L.
Athabaska
Ft.Churchill
Ft.Chipewyan
Ft.Norman
Ft.McPherson
Ft.Simpson
Ft.Yukon
Dawson
Sitka
Prince Rupert
Edmonton
Battleford
Calgary
Medicine Hat
Lethbridge
Regina
Winnipeg
L.Winnipeg
York Factory
Port Arthur
Ottawa
Montreal
Quebec
Halifax
St.John
Sydney
C.Race
C.Farewell
C.Chidley
Hudson Strait
Davis Strait
Baffin Land
Melville Bay
Upernivik
Disco Bay
Godthaab
Julianehaab
Frederikshaab
Christianshab
Scoresby Land
King William Land
Peary Land
Ellesmere Land
Greenland
Iceland
Spitsbergen
Jan Mayen
Alaska Pen.
Kodiak I.
Aleutian Is.
Behring Sea
Behring Strait
Kamchatka Pen.
Asia
Queen Charlotte Is.
Vancouver I.
Victoria
Olympia
Portland
Seattle
Spokane
Helena
Boise
Cascade Range
Sierra Nevada
Great Salt Lake
Salt Lake City
Carson City
Sacramento
San Francisco
C.Mendocino
Yellowstone Nat.Park
Bismarck
Fargo
Duluth
Pierre
Minneapolis
St.Paul
Milwaukee
Detroit
Chicago
Buffalo
Cleveland
Pittsburg
Toronto
Hamilton
Rochester
Boston
Providence
New York
Philadelphia
Baltimore
Washington
Cheyenne
Omaha
Des Moines
Indianapolis
Columbus
Cincinnati
Louisville
Richmond
Raleigh
C.Hatteras
Bermuda Is.
Denver
Topeka
St.Louis
Kansas City
Pueblo
Arkansas R.
Santa Fe
Oklahoma City
Little Rock
Memphis
Nashville
Atlanta
Charleston
Savannah
Jacksonville
Grand Canyon
Sierra Madre Mts.
Los Angeles
San Diego
Santa Barbara Is.
Phoenix
Tucson
Ft.Worth
Dallas
Austin
Houston
Galveston
New Orleans
Mobile
Jackson
Tampa
Key West
Nassau
Bahama Is.
Havana
Cuba
Yucatan Channel
Juarez
El Paso
Rio Grande
Chihuahua
San Antonio
Lower California
Gulf of California
Guadalupe I.
Tropic of Cancer
Sierra Madre
Monterey
Durango
Mazatlan
C.San Lucas
C.Corrientes
Guadalajara
Manzanillo
Mexico
San Luis Potosi
Tampico
Progreso
Vera Cruz
Gulf of Campeche
Yucatan
Campeche Pen.
Belize
Acapulco
Gulf of Tehuantepec
Guatemala
Honduras
Nicaragua
Costa Rica
Panama
Panama Canal
Colon
San Jose
Managua
Tegucigalpa
New Guatemala
San Salvador
Jamaica
Kingston
Haiti
Santo Domingo
Porto Rico
San Juan
Virgin Is.
Leeward Is.
Windward Is.
Trinidad
Barbados
Curacao
Venezuela

Norristown (nor'is-toun), a city of Pennsylvania, county seat of Montgomery Co., on the Schuylkill, 17 miles N. W. of Philadelphia. It has important manufactures including cotton and woolen goods, carpets, flour, cigars, lumber, machinery hardware, etc. Here is a State hospital for the insane, and near by are several charitable institutions. Pop. (1910) 27,875; (1920) 32,319.

Norrköping (nor-cheup'ing), a town of Sweden, at the mouth of the Motala Elf in the Bravik, a gulf of the Baltic. The Motala Elf flows through the town, making several falls within it, and is crossed by several bridges. It has manufactures of woolens, cottons, etc., and has sugar refineries and shipbuilding yards. Pop. 47,000.

Norse (nōrs), the language of Scandinavia. *Old Norse* is represented by the classical Icelandic, and still with wonderful purity by modern Icelandic. The literature includes the early literature of the people of Norway, Sweden and Iceland.

Norte (nor'tā), RIO GRANDE DEL, a river of Mexico, rising in the Rocky Mountains and emptying itself into the Gulf of Mexico. Its mouth is 1200 feet wide, but is barred so as to afford entrance only to boats. Length about 2000 miles.

North, one of the cardinal points, being that point of the horizon or of the heavens which is exactly in the direction of the North Pole. See *Pole.*

North, CHRISTOPHER. See *Wilson, John.*

North, FREDERICK, LORD, Earl of Guildford, the eldest son of Francis, second earl of Guildford, born in 1732; died in 1792. He belongs to English history as chief of the administration during the American war of Independence. Obtaining a seat in the House of Commons he was, in 1759, appointed a commissioner of the treasury, but resigned in 1765, when he joined the opposition to the Rockingham ministry. He came into office again with the Grafton ministry, 1766; in 1767 became chancellor of the exchequer; and in 1770 succeeded the Duke of Grafton as minister, when his retention of the tea-duty, imposed upon the American colonists, led to the rising in America, and to the declaration of independence, July 4, 1776. Lord North resigned March 20, 1782. He became Earl of Guildford by the death of his father in 1790.

North Adams, a city of Berkshire County, Massachusetts, on the Hoosac River, near the west end of the great Hoosac Tunnel, 36 miles E. of Albany. It is surrounded by beautiful mountain scenery, is the seat of a State normal school, and has extensive cotton, print and woolen mills, also boot and shoe, paper-box and other industries. Pop. (1920) 22,282.

Northallerton (nôrth'al-er-tun), a town of England, Yorkshire, in the North Riding, 32 miles N. N. E. of York. The inhabitants are chiefly engaged in agriculture, and some tanning and currying are carried on. Pop. 7745.

North America, the northern half of the western continent, or New World. Under *America* a general description of North America has been given, more especially as compared and contrasted with South America, but some additional information may be appended.

Physical Features.—The mainland of North America, in the widest sense of the name, is united to South America by the Isthmus of Panama, and extends from lat. 7° N. to lat. 72 N. In a narrower sense, and excluding the southern portion often spoken of as Central America, it extends only from lat. 15° N. To it on the north belongs an extensive archipelago of arctic islands, to the northeast of which lies Greenland, the latter generally regarded as belonging to America. The figure of North America is very irregular, and in that respect it resembles Europe. On the north is the great indentation of Hudson Bay, almost an inland sea, connected with the Atlantic by Hudson Strait. On the east are the Gulf of St. Lawrence, with the island of Newfoundland and the peninsula of Nova Scotia at its entrance; and the Gulf of Mexico, having on one side of its entrance the peninsula of Florida, on the other that of Yucatan. From the entrance of the gulf stretch eastward Cuba and others of the West India Islands. The chief features of the Pacific coast are the Gulf of California and peninsula of Lower California—further north Vancouver Island and the chain of other islands lining the coast. The continent terminates in a peninsular extension forming Alaska Territory, separated from Asia by Behring's Sea and Strait, the latter about 50 miles wide. The area of North America (excluding Greenland but including the West Indies) is about 8,150,000 sq. miles, or considerably more than double that of Europe. As regards its surface and physical features generally it presents certain points of similarity with Europe—numerous large rivers, elevated mountain chains, and large plains suited for the growth of cereals and other crops;

but most of its physical peculiarities are on a scale of greater magnitude than those of Europe. Thus its greatest mountain system, that of the Cordilleras (of which the Rocky Mountains strictly speaking form only a part), extends along the entire western side of the continent for a distance of at least 5000 miles, and rises to the height of 20,000 feet. The great plains which stretch on the east of these mountains from the Arctic Ocean to the Gulf of Mexico are also of far greater magnitude than those of Europe, contain the largest bodies of fresh water in the world, and are intersected by a series of rivers, one of which, the Mississippi-Missouri, is the longest of all rivers (length 4200 miles). The basin of the Mississippi-Missouri is bounded on the east by the Appalachian chain, one of much less comparative magnitude, but forming an important feature of the surface conformation of the continent. In its great navigable rivers and lakes North America possesses an immense system of inland navigation. As the great watershed of North America is formed by the Rocky Mountains, all the chief rivers, with the exception of the St. Lawrence, have their sources on its slopes or plateaus, whence they flow to the Gulf of Mexico, the Pacific, the Arctic Ocean, or Hudson Bay. At more than one point in the system the water-parting is formed by a lake or marsh sending a stream on one side to the Pacific and on the other side to the Atlantic. The Nelson, Mackenzie and Yukon are the chief rivers which flow into the Arctic Ocean, the last named having only recently been recognized as one of the great rivers of the world. The St. Lawrence is the largest of those which flow directly to the Atlantic. The lakes drained by the St. Lawrence, namely, Superior, Michigan, Huron, Erie, and Ontario, together cover an area of 97,000 square miles (or more than that of Great Britain). The largest, Lake Superior, has an area equal to that of Ireland. Other large lakes further to the north include Winnipeg, Athabasca, Great Bear Lake and Great Slave Lake. The principal islands on the east are those of Newfoundland, Anticosti, Prince Edward and Cape Breton, all at the mouth of the St. Lawrence; the Bahama Islands, Cuba, Hayti, Porto Rico and Jamaica. On the northwest coast the principal islands are Vancouver's Island, Queen Charlotte's Island and King George III's Archipelago. The only others of any importance are the Aleutian Islands, stretching west from the peninsula of Alaska: the islands in the Arctic Ocean are almost inaccessible.

Climate and Productions.—The climate, which ranges all the way from tropical to frigid, admits of a vast variety of vegetable products being grown, and though in the far north extremely rigorous, as a whole it is healthful and well suited to the peoples of Teutonic origin who form so large a portion of the inhabitants. As regards minerals and other products North America is exceptionally favored, possessing abundance of all those that are most valuable—gold, silver, copper, iron, lead and coal. Immense quantities of gold and silver have been produced. The coal fields are very extensive. There are vast quantities in the eastern and central and some of the western states, while Alaska is also very rich in coal. Iron is worked in many parts (especially in the Lake Superior district), as are also copper, zinc, aluminum and lead. Salt is likewise widely diffused. The forests are of vast extent, and include a great variety of the most useful timber trees, as pines, oak, ash, hickory, beech, birch, poplar, sycamore, chestnut, walnut, maple, cedar, etc. Maize or Indian corn is the only important farinaceous plant peculiar to the New World, but almost all fruits and grains known to Europe are cultivated to perfection in North America, to which Europe is now indebted for immense quantities of agricultural and dairy produce, as well as provisions of various kinds, and raw materials such as cotton, etc.

Divisions.—The political divisions of North America are the United States, the Dominion of Canada, Newfoundland, Mexico, and the Central American States. Canada occupies almost the whole of the continent north of the great lakes and lat. 49° N. The territory of the United States extends from the British possessions to Mexico and the Gulf of Mexico, and from the Atlantic to the Pacific Ocean. Alaska Territory, belonging to the United States, occupies the northwest corner of the continent. The republican form of government prevails everywhere except in the British dominions. The areas and population are as follows:

	Area, sq. miles	Pop.
British America (including Newfoundland)	3,893,000	8,833,000
United States (including Alaska)	3,617,673	105,763,670
Mexico	767,605	15,115,000
Central American States	208,500	5,500,000
West Indies	95,000	6,100,000
	8,581,778	141,311,670

People.—The population (in spite of the varied immigration) consists

most largely of people of British or at least Teutonic origin, though the French and Spanish elements are also well represented. In the United States people of negro race numbered in 1910, 9,828,296. The aboriginal tribes of North America, known as Indians, are of a hardy and warlike character, but they are gradually dying out before the march of the white man. They have all so strong a resemblance to each other in physical formation and in intellectual character as to leave no doubt of their belonging to one family. (See *Indians, American.*) In Mexico a people of the same race, the Aztecs, had made considerable progress in civilization before the arrival of the Europeans. In the extreme north we find the Eskimos, who differ considerably from the Indians, but are often classed along with them as people of Mongoloid origin.

Discovery.—America is now believed to have been visited by Norsemen in the tenth and eleventh centuries; but the modern discovery is due to Columbus, who reached one of the West Indies in 1492. Following his lead the first to reach the mainland was John Cabot, who, with his son Sebastian, sailed from Bristol in 1497, and on June 24 came in sight of Labrador. In 1512 Florida was discovered by Ponce de Leon. Giovanni Verazzano, a Florentine sent out by Francis I of France in 1524, surveyed upwards of 2000 miles of coast, and discovered that portion now known as North Carolina. Ten years afterwards, Jacques Cartier, a seaman of St. Malo, sailed from that port for Newfoundland, the north coast of which he surveyed and minutely described. He subsequently made several voyages, and was the first European to enter the St. Lawrence, ascending it as high as the site of Montreal. The Spaniards had previously conquered Mexico, and a desire to extend their dominion (1519-21) in a northerly direction led to further discoveries in North America. The coast of California was discovered by Ximenes, and in 1539 the Gulf of California was first entered by Francisco de Ulloa. In 1578 Drake visited the northwest coast. These discoveries were followed by those of Davis in 1585-87, Hudson in 1610, Bylot and Baffin in 1615-16, all in the northeastern seas. By this time settlements had been made by the French, English and Dutch. The French occupied Nova Scotia and Canada, and later Louisiana. Captain Behring, who was sent out in 1725 by the Empress Catharine, set at rest the disputed point whether Asia and America were separate continents. Other names associated with American maritime discovery are Cook, Meares, Vancouver, Kotzebue, and, more recently, Ross, Parry, Franklin, Beechey, McClintock; Kenzie, Back, Rae, Simpson and Schwatka, and polar discoverers Kane, Hall, Hayes, Greely, Peary, etc. (See also *North Polar Expeditions.*) The Canadian authorities have in recent years done much in the way of survey and exploring the less-known portions of the Dominion, and Alaska has been made known by the efforts of expeditions from the United States. For general history see *Canada, United States, Mexico,* etc.

Northampton (n ô r th'amp-tun), a borough of England, capital of the county of same name, on the left bank of the Nene, which is connected with the Grand Junction Canal. Northampton has several noteworthy churches, especially one of the three remarkable round churches of the country —a Norman structure of great interest; and the other more important buildings are the town-hall, the shire or county hall, the corn exchange, cattle market, infirmary, etc. The staple manufacture is boots and shoes for home and export trade. The currying of leather is also carried on on a large scale. There are also iron and brass foundries, breweries, corn mills, etc., and iron ore, found near by, is smelted. Pop. 92,041. The county, in south-central England, has an area of 998 sq. miles. It is pleasantly diversified by low hills, beautiful vales, extensive woodlands copiously watered by numerous rivers and streams, the chief of them being the Nene, which flows through the county to Peterborough and the Wash. The soil is mostly rich and fertile, consisting principally of various kinds of loam. The principal grain crops are wheat, barley, and oats. The rearing of sheep and cattle is a principal object with the Northamptonshire farmers. Iron ore of excellent quality is found in vast beds, and of late years this has developed into an important industry. Pop. 348,552.

Northampton, a city, county seat of Hampshire Co., Massachusetts, beautifully situated on the Connecticut River, 18 miles N. of Springfield, and a summer resort as well as a manufacturing city and educational center. Among its educational institutions are Smith College, the largest college for women in the U. S.; the Burnham and Capen preparatory schools for girls; Clark School for the deaf, pioneer in the training of the deaf to talk and hear by the lip language; Smith Agricultural School, State Asylum, etc. Its manufactures in-

clude silk products, toilet goods, including tooth brushes, cutlery and tableware, hydrants, filtering plants, paper-mill machinery, baskets and veneer drums, burial cases, paper boxes, inks, shovels and tools. Pop. (1910) 19,431; (1920) 21,951.

Northampton, a borough of Northampton Co., Pennsylvania, 13 miles W. by N. of Easton. It manufactures cement, flour, shirts, silk, art glass, incubators, etc. Pop. (1920) 9349.

North Andover, a town of Essex Co., Massachusetts, about 28 miles N. of Boston. Woolen goods, machinery, etc., are manufactured. Pop. (1920) 6265.

North Attleborough (at'l-bur-ō), a town of Bristol Co., Massachusetts, 14 miles N. by E. of Providence, R. I. It has manufactures of jewelry and jewelers' supplies, etc. Pop. 9238.

North Bay, a town on Lake Nipissing, Ontario. It is in a lumbering and mining region. Pop. (1920) 9413.

North Borneo (bōr'ne-ō), the territory occupying the northern part of the island of Borneo (q. v.) under the jurisdiction of the British North Borneo Company, having been ceded by the Sultans of Sulu and Brunei in 1877-78 and the company having received a royal charter in 1881. The territory embraces 31,000 square miles, and has a pop. of 210,000. The interior is very mountainous. Coal and gold have been found, and the territory is believed to be very rich in minerals. The exports comprise wax, edible birds'-nests, cocoanuts, gutta-percha, sago, tobacco, rattans, rubber and timber. With Brunei and Sarrawak it was made a British protectorate in 1888.

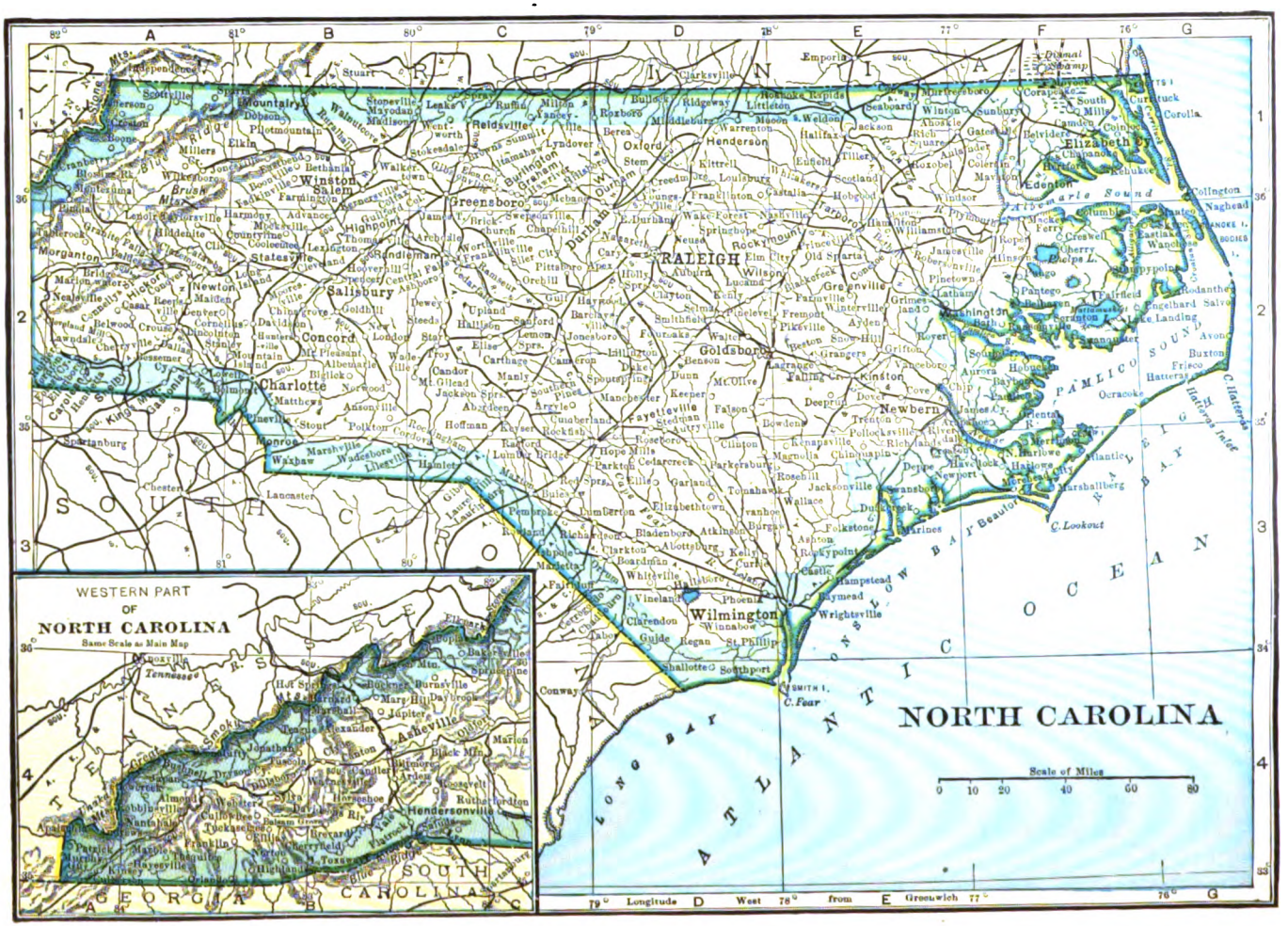
North Braddock, a borough of Allegheny Co., Pennsylvania, 8 miles E. S. E. of Pittsburgh. Has large steel mills. Pop. (1910) 11,824; (1920) 14,928.

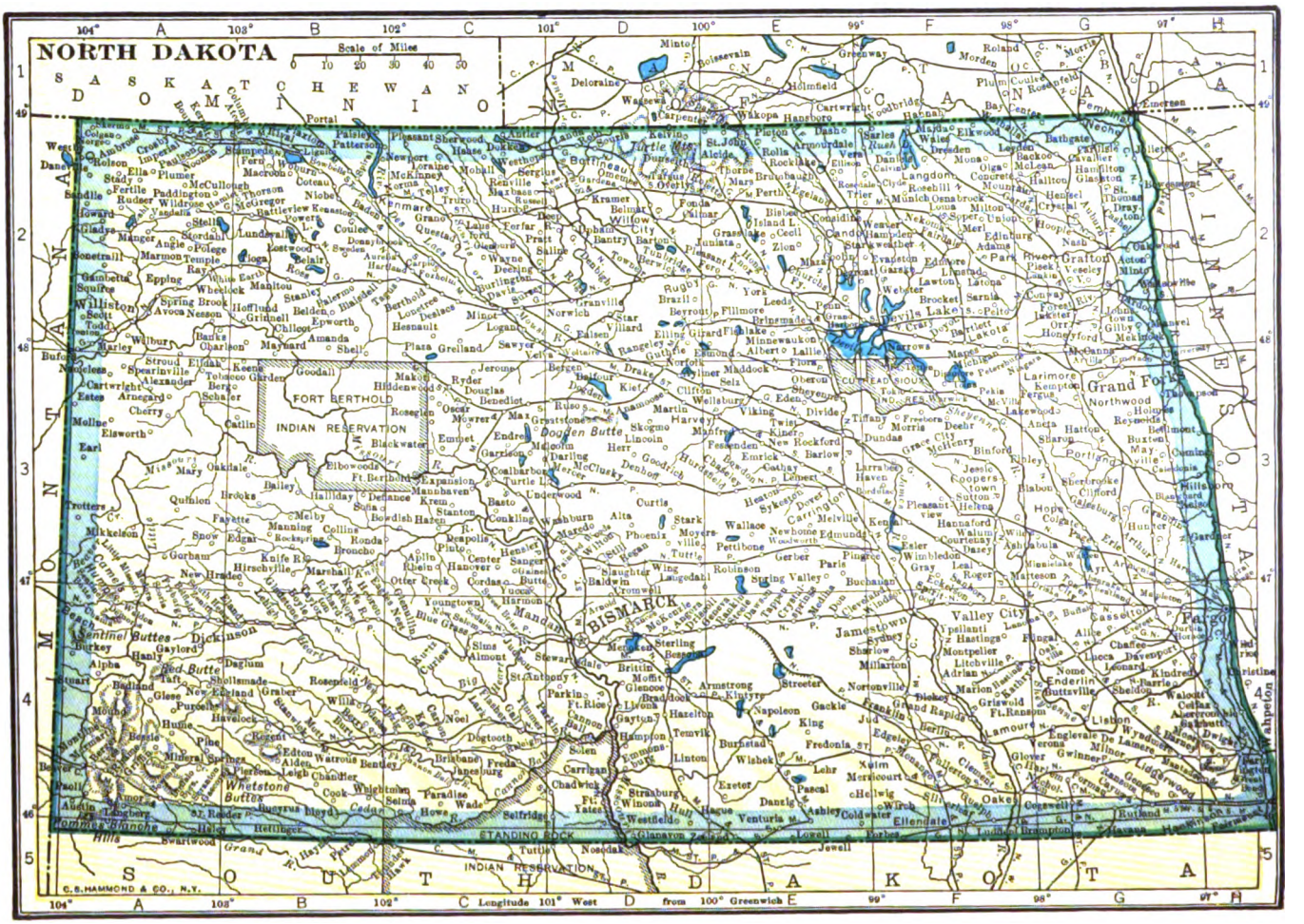
Northbridge, a town of Worcester Co., Massachusetts, on Blackstone River, 15 miles S. E. of Worcester. There are manufactures of shirtings, cotton prints, silks, machinery, etc. Pop. (1920) 10,174.

Northbrook (nōrth'brök), THOMAS GEORGE BARING, EARL OF, an English statesman, son of the first Baron Northbrook, born in 1826. He entered parliament in the Liberal interest in 1857; was lord of the admiralty from 1857 to 1858, under-secretary of state for India from June, 1859, to January, 1861, for war from the latter date to June, 1866, and again on the accession of Mr. Gladstone from December, 1868, to February, 1872, when he was appointed viceroy of India. This office he resigned in 1876, and was created Earl of Northbrook. On the formation of the Gladstone cabinet, in 1880, Lord Northbrook was appointed first lord of the admiralty. In 1884 he was placed at the head of the British commission governing Egypt. He died in 1904.

North Cape, a celebrated promontory, forming the most northern point of Europe, and situated on the north of the island of Magerōe, which is separated from the mainland of Sweden by a narrow channel.

North Carolina, one of the original United States, on the Atlantic coast, is bounded N. by Virginia, E. and S. E. by the Atlantic, S. by South Carolina and Georgia, and W. by Tennessee; area, 52,426 sq. miles. The surface is very varied. For nearly 100 miles inland from the coast it is level, marshy and swampy, the soil sandy but very fertile; the middle section has a varied surface and fine soil; farther inland hilly land begins, rising until it reaches the mountains of the western border, which include the loftiest peaks of the Appalachians, the highest being Mount Mitchell, 6711 feet. There are yellow pine, oak, and other valuable trees. In the east the river bottoms and reclaimed swamp lands yield abundantly, rice, cotton, corn, apples, peaches, pears, honey and beeswax being produced. Cranberries are extensively raised, and the Catawba and Scuppernong grapes are natives of the soil. The middle section is adapted to the culture of the cereals, tobacco and cotton, and sweet potatoes are a leading staple. In the production of peanuts North Carolina stands third among the states. The pine section of the coastal region is largely uncultivated, but there is a considerable production of timber, tar, and turpentine. The fisheries are large and valuable. The state is rich in useful minerals, coal and iron being very abundant. The coal is largely bituminous and occurs in two large fields, while magnetic and hematite iron ores occur over a wide region, the Cranberry mine, in Mitchell County, yielding the purest magnetic ore yet found in the United States. Gold is mined to a considerable extent, and there is a branch of the United States mint at Charlotte. Silver, lead and zinc are found, and copper ores cover a wide field. Mica is mined and corundum and many other minerals occur, including some precious stones. Cotton goods form the leading manu-


NORTH CAROLINA
WESTERN PART
OF
NORTH CAROLINA
Same Scale as Main Map
RALEIGH
Wilmington
Charlotte
Greensboro
Winston
Salem
Asheville
Henderson
Goldsboro
Newbern
Elizabeth City
Edenton
Hendersonville
Statesville
Salisbury
Concord
Reidsville
Scale of Miles
0 10 20 40 60 80
Longitude D West 78° from E Greenwich 77°
SOUTH CAROLINA
GEORGIA
TENNESSEE
VIRGINIA
ATLANTIC OCEAN
PAMLICO SOUND
C. Lookout
C. Fear
C. Hatteras


NORTH DAKOTA
Scale of Miles
0 10 20 30 40 50
SASKATCHEWAN
MANITOBA
MINNESOTA
SOUTH DAKOTA
FORT BERTHOLD INDIAN RESERVATION
STANDING ROCK INDIAN RESERVATION
BISMARCK
Grand Forks
Fargo
Valley City
Jamestown
Minot
Williston
Dickinson
Devils Lake
Dogden Butte
Sentinel Buttes
Red Butte
Whetstone Butte
Killdeer Mountains
Turtle Mts.
Pembina Mts.
Missouri R.
Souris R.
Red R.
James R.
Heart R.
Knife R.
Little Missouri R.
Cannonball R.
Sheyenne R.
Pembina R.
Mouse R.
Long Lake
Lake Sakakawea
Lake Audubon
Lake Darling
Lake Ashtabula
Lake Metigoshe
Lake Nettie
Lake Tschida
Lake Williams
Lake Ilo
Lake Patterson
Lake Tewaukon
Lake Ardoch
Lake Alice

facture, followed by tobacco manufactures, lumber and timber products, cotton-seed oil and cake, and flour and grist-mill products. Large quantities of lumber, cotton, tobacco, and other products are exported to coastwise and foreign ports. There are numerous rivers, including the Cape Fear, the Roanoke, the Neuse, the Tar, the Pamlico, and others, yielding several hundred miles of navigable waters. The State University (2232 students) is at Chapel Hill; the Agricultural College at West Raleigh. North Carolina was one of the seceding states. The capital is Raleigh; largest cities, Winston-Salem and Charlotte. Pop. (1900) 1,893,810; (1910) 2,206,287; (1920) 2,556,486.

Northcliffe, 1st Baron, of Isle of Thanet, Alfred Charles Harmsworth (1865-), an English newspaper owner, was born in Dublin, Ireland, removed to London and established several weekly and monthly papers. He founded the *Daily Mail*, a halfpenny newspaper which had a sensational tone. In 1908 he secured control of the London *Times*. In 1917, during the European war, he visited America on a special mission from Great Britain, and was for a time Director of Propaganda.

Northcote, STAFFORD. See *Iddesleigh*.

North Dakota (da-kō'ta), one of the northwestern United States, bounded N. by Canada, S. by South Dakota, E. by Minnesota, and W. by Montana; area, 70,837 square miles; length, about 355 miles; width, about 200 miles. On its eastern border is the navigable Red River of the North, and the Missouri traverses the State from the W. to the S. E. through a region of high plains and plateaus. It is navigable for boats of three to six hundred tons burden. Its principal affluents are the Yellowstone, Little Missouri, Knife, Heart, and Cannon Ball rivers. There are other streams in the north flowing into Canada. The general elevation ranges from 800 feet on the E. to 2000-2800 on the W. and S. W.; the portion of the State E. of the Missouri being mostly rolling prairie; that W. being more broken. In the N. is a group of hills of moderate elevation known as Turtle Mountain. Between the basins of the Mouse and Red rivers is a limited area with no outlet to the sea for its waters, and containing a large salt lake, known as Devil's Lake, a picturesque sheet of water about 40 miles long. In the S. W. is a district of eroded dry hills, called the 'Bad Lands,' generally a good grazing region. The land on the Missouri slope has a black, sandy soil with dry subsoil; that of the Red River valley is a vegetable deposit of unsurpassed richness. Minerals of all kinds are wanting except lignitic coal and clay, of which there are extensive deposits. A successful method of making lignite coal into briquettes has been found, and the manufacture for commercial purposes has begun. Salt springs and streams are numerous in the Red River Valley. The air is dry and invigorating, and the climate very healthful, though severe in winter, the mercury sometimes falling to 40° below zero. The absence of humidity enables this severe weather to be borne with comparatively little discomfort. Wheat has been the leading agricultural product, but corn raising and dairy industries are rapidly increasing. The Red River valley is unsurpassed as a wheat-growing section, and Dakota wheat has a wide reputation. Other important crops are flaxseed, oats, barley, hay, potatoes, rye and Indian corn. In the western section stock-raising is an important industry, and much wool is produced. The State University (1444 students) is at University, near Grand Forks; the Agricultural College at Fargo. Bismarck is the capital. North and South Dakota were admitted into the Union in 1889. Pop. (1900) 319,146; (1910) 577,056; (1920) 645,730.

Northeast Passage, a passage for ships along the northern coasts of Europe and Asia to the Pacific Ocean, formerly supposed likely to be of commercial value. The first to make the complete voyage by this passage was the Swedish explorer Nordenskiöld, after it had been from time to time attempted in vain for upwards of three centuries.

Northeast Territory, a territory of Canada on the east of Hudson Bay, and extending south to Quebec province. It forms part of the peninsula of Labrador, and is little known. It is intersected by Rupert's River, East Main River, Big River, Great and Little Whale River, etc., all flowing west to Hudson Bay, and contains numerous lakes. Furs are the only commodity as yet obtained from it. See *Canada*.

Northern-drift, in geology, a name formerly given to boulder-clay of the Pleistocene period, when its materials were supposed to have been brought by polar currents from the north.

Northern Lights. See *Aurora*.

Northern Mythology (mith'ol-ō-ji), the

mythology of the Scandinavian peoples inhabiting Denmark, Norway, Sweden and Iceland. According to the Scandinavian mythical cosmogony there were originally no heavens above nor earth below, but only a bottomless deep (*Ginungagap*), north of which was a world of mist (*Niflheim*), and south of which was the world of light or fire (*Muspelheim*). A warm wind blowing from the latter upon the ice of Niflheim melted it, and from the drops sprang Ymir, the ice giant. Ymir was fed by the cow Audhumbla, which arose in the same way. As she was one day licking blocks of ice, human hair grew out of them, and then an entire man, called Buri. His son was Bor, who had three sons, Odin, Vili and Ve, who became the rulers of heaven and earth. The children of Bor were good, those of Ymir wicked; and they were constantly at war with each other. The sons of Bor finally slew the ice giant, dragged his body into the deep, and from it created the world. Out of two trees Odin, Vili and Ve created a man, called Askur, and a woman, Embla. The earth was supported by a large ash, called Ygdrasil, whose branches extend over the world, while its top reaches above the heaven. The residence of the gods was Asgard, whence the bridge Bifröst led to the earth. The giants dwelt in Jötunheim or Utigard, and men in Midgard. As in Greek mythology there was an older and a newer dynasty of the gods. The ancient and modern systems seem to have their connecting point in Odin, as with Zeus in the Greek system. Aesir or Aser is the name for the new race of gods. They are Odin, or Woden, the god of gods, the *Alfadur* (All-father), who lives forever; from him and his wife Frigga are descended the other gods. Among their sons are Thor, god of thunder, the strongest of gods and mortals, whose hammer, Miölnir, crushes the hardest objects, and Baldur, the youthful and beautiful god of eloquence. Niord is the god of winds, of sailors, of commerce, and of riches; his son Frei is the ruler of the sun, and upon him depend rain and sunshine, plenty or dearth. Freya is the goddess of love. The mildest and most bountiful of the gods, she is a friend of sweet song, and loves to hear the prayers of mortals. Tyr, a son of Odin, the fearless god, who wounds by a look, is lofty as a fir, and brandishes the lightnings of battle. He is not properly the god of war, but rather of power and valor. His brother Braga is the god of wisdom and poetry. Braga's wife is Iduna, who preserves the apples of immortality, which she offers in vessels of gold to the heroes at their entrance into Valhalla. The Valkyrias or 'choosers of the slain' are awful and beautiful beings, neither daughters of heaven nor of hell. Mounted on swift horses, they conducted the heroes to Valhalla. Another striking figure is Loki, as beautiful as he is malignant. By the giantess Angerbode he had Hela, the goddess of the lower regions, the wolf Fenrir, and the terrible serpent of Midgard, Jormungandur, which surrounds the whole world.

North Little Rock, a city of Pulaski Co., Arkansas, on Arkansas River, opposite Little Rock, in a fruit and farm region. It has lumber, oil, and creosote works, railroad machine shops, etc. Pop. (1910) 11,138: (1920) 14,048.

Northmen, the inhabitants of ancient Scandinavia, or Norway, Sweden and Denmark, who in England were also called *Danes*. They were fierce and warlike tribes, who as early as the eighth century made piratical expeditions to all parts of the European seas, these piratical robbers being known among themselves as *vikings*. In 795 the Scandinavians established themselves in the Faröe Isles and in Orkney; towards the middle of the ninth century they founded the governments of Novgorod and of Kiev, in Russia; and after the discovery of Iceland certain powerful Norwegian families, taking refuge from the persecutions of Harold, king of Denmark, settled in that island (in 870). In the ninth century they made repeated incursions into France, and it became necessary to purchase their retreat with gold. In that country latterly bands of them settled permanently, and Charles the Simple was obliged (912) to cede to them the province afterwards called *Normandy*, and to give his daughter in marriage to Rollo, their chief. Rollo embraced the Christian religion and became the first Duke of Normandy. The course of events was somewhat similar in England. Egbert, in the beginning of the ninth century, had no sooner made some approaches towards a regular government than the Danes made their appearance. Under Alfred (871-901) they overran great parts of England, but were finally defeated, and those of them who remained in the country had to acknowledge his sway. But they returned, under his successors, in greater force, obtained possession of the northern and eastern part of the country, and in the beginning of the eleventh century three Scandinavian princes (Canute, Harold and Hardicanute) ruled successively over England. The Saxon line was then re-

stored; but in 1066 William, duke of Normandy, a descendant of Rollo, obtained the English throne, an event known as the Norman Conquest. According to the Saga narratives the Northmen were the first discoverers of America.

North Plainfield, a borough of Somerset Co., New Jersey. In the Plainfield County Union. Pop. (1920) 6916.

North Platte (plat), a town, county seat of Lincoln Co., Nebraska, at the junction of the North and South Platte rivers, 290 miles w. of Omaha. It has the Union Pacific railroad shops, station, flour mills, etc. Pop. (1910) 4793; (1920) 10,466.

North Polar Expeditions:

Irish navigators are supposed to have discovered Iceland about the year 800 A. D. The Norsemen continually adventured to the limits of the known world and between 870 and 1200 had discovered and explored the coast of virtually all the land lying between Novaya Zemlya on the east and Labrador on the west, including Greenland and a considerable portion of Davis Strait and Baffin Bay. Among them Leif Ericsson is creditably reported to have landed upon the coast of Nova Scotia in the year 1000, and thus to have been the first discoverer of America. Five hundred years later, however, the work of the Norsemen had to be done again for the information of intelligent Europe, and it was not until the middle of the seventeenth century that the territory known to the Vikings had been rediscovered and brought back into the circle of general knowledge. Two great objects stimulated all Arctic exploration for hundreds of years—the attempt to find a northwest passage around America to India and the attempt to find a northeast passage around Europe and Asia to China. A practical reason for this arduous search was the fact that the Spanish and Portuguese in the time of Henry VIII held the southern seas impassable to their enemies. Accordingly Sebastian Cabot was commissioned by Henry VIII to find a northwest passage in 1508, while in 1553 Willoughby and Chancelor sailed around Norway and discovered the White Sea, opening up trade with Russia. Frobisher reported Baffin Land in 1576, and Davis in his three voyages explored Davis Strait about 1585. Henry Hudson investigated the east coast of Greenland in 1607, discovering the island of Jan Mayen, and on his last voyage found the Hudson River and then sailed into Hudson Bay, from which he never returned. Button, Baffin, Fox and James sailed through several passages west of Davis Strait und Baffin Bay, discovering land and water which bear their names between the years 1612 and 1632. Meantime the eastern passage as far as the mouth of the Ob River, and including Spitzbergen, had been explored by Borough, Brunel and Barents. By this time, when the Hudson Bay Company was incorporated, in 1670, little more had been learned than was known to the Norsemen five hundred years earlier. American exploration by land was carried on largely by the Hudson Bay Company's servants, Hearne discovering the Coppermine River in 1769-72, and Mackenzie exploring the Mackenzie River in 1789. Franklin explored 924 miles of the Arctic coast of North America between 1819 and 1826. Back traced the length of Great Fish River in 1834; Simpson, Dease and Rae completed the exploration of the rest of the Arctic shore between 1837 and 1847. Scoresby followed the east coast of Greenland; Parry in three voyages found Barrow Strait, Wellington Channel, Melville Island, Melville Peninsula, Fury and Hecla Straits between 1819 and 1823; and in 1827 reached 82° 45′ in an attempt on the Pole. Ross discovered Boothia and the Magnetic Pole and found King William Land in 1831. On the Asiatic Arctic coast, Deshnef went through Bering Strait in 1647; Chelyuskin found the most northern point of Asia in 1743, and Bering rediscovered Bering Strait in 1728, including also a considerable portion of the Alaska coast and the Aleutian Islands in 1741; Liakhoff found the New Siberia Islands in 1771; Cook sailed through Bering Strait in 1778, and Beechey went through as far as Point Barrow in 1826. The Russians in the meantime had completed tracing the Siberian coast. Franklin, in 1845, attempting to discover the northwest passage, and perishing in 1847 in King William Land, occasioned the exploration by search parties of a vast area and extent of coast line. Ross, McClintock and Austin, in 1850-51, by sledging from the eastward, and Collinson and McClure entering through Bering Strait on the west, settled the question of a northwest passage. McClure sailed eastward to Barrow Strait and was rescued by Kellett so that he and his men made the northwest passage although their ship was abandoned. Collinson came through Bering Strait and as far as the east end of Victoria Land in the same years as McClure, 1850-54. Kellet's sledges explored as far west as Prince Patrick Island in 1852-54, while

in the latter year Rae, journeying overland for the Hudson Bay Company, was told of Franklin's fate by Eskimos. Grinnell's party, and those of Kane, Hayes and Hall from 1850 to 1871 explored a large part of the coast about Smith Sound, Grinnell Land and North Greenland. The Koldewey expedition reached as far as Cape Bismarck on the east coast of Greenland in 1869–70. The Austrians, Payer and Weyprecht discovered Franz Josef Land in 1873–74. The British expedition under Nares pushed the *Alert* through the Robeson Channel and wintered in 82° 27′ on the north coast of Greenland and explored the neighborhood in the years 1875–76. A great feat was that of Nordenskiöld, who made the northeast passage in 1878–79, the *Vega* being the first vessel to sail from Europe through the Arctic and Bering Strait. Several American expeditions were noteworthy—that of Schwatka to King William Land in 1879; De Long in the ill-fated *Jeannette* in 1879–82; Berry, who surveyed Wrangell Island, and Greeley who held a meteorological station for the years 1882–83 and explored North Greenland and Grinnell Land. Peary was gaining experience in 1886 in Greenland, while Nansen crossed Greenland for the first time two years later. In 1891–92 Peary crossed Greenland at its widest point in the North. Nansen's bold drift in the *Fram* from 1893–96 from the New Siberia Islands across the Polar Ocean, when the ship reached the high latitude of 85° 55′, was a spectacular and most valuable scientific achievement, as was Nansen's long sledging journey after he left the *Fram* to reach the latitude of 86° 5′ and return to Franz Josef Land, where he was rescued by Jackson, who was exploring Franz Josef Land in 1894–97. Wellman and Fiala made further researches in the same territory. The Duke of the Abruzzi led an Italian expedition to reach the North Pole from Franz Josef Land in 1899–1900, Cagni, of his expedition, reaching 86° 34′ on a sledging journey. Andree's balloon drift from Spitzbergen resulted fatally in 1897. Sverdrup, Nansen's captain, discovered and explored Heiberg Land and Ringnes Land, west of Grinnell Land, in 1899–1903. North of Siberia, Toll lost his life on Bennett Island in 1902. The northwest passage was now achieved by Amundsen in his small boat, the *Gjöa* by entering Lancaster Sound and emerging at Bering Strait between the years 1903–06. Mylius-Erichsen mapped the northeast portion of Greenland between 1906–08 followed by Mikkelsen. Peary had spent four years, ending in 1902, in the neighborhood of Smith Sound, exploring the land and ice, and gaining experience for his Polar dash. In 1905–06 he made a sledging journey to 87.6 north; and in 1908–09 a final attempt for the Pole from Cape Columbia, the most northerly point of land then known, and reached the North Pole April 6, 1909. After this date, the possibility of major discoveries was greatly reduced. Vilkitsky found new islands north of Cape Chelyuskin in 1913; McMillan disproved the existence of the reported Crockerland, northwest of Grant Land in 1914, and Stefansson discovered new land north of Prince Patrick Island in 1915.

North Pole. See *Pole*.

North Providence, county seat of Providence Co., Rhode Island, 5 miles from Providence. It has manufactures of woolens, etc. Pop. (1920) 7697.

North Sea, or GERMAN OCEAN, a large branch of the Atlantic Ocean lying between Great Britain and the continent of Europe, having the former and the Orkney and Shetland Islands on the west; Denmark and part of Norway on the east; Strait of Dover, part of France, Belgium, Holland, and Germany on the south; and the Northern Ocean on the north. Extreme length, from the Strait of Dover to Unst, the most northern of the Shetland Isles, about 600 miles; greatest breadth, between Haddingtonshire, Scotland, and Denmark, about 400 miles; area, not less than 162,000 square miles. The North Sea is deepest on the Norwegian side, where the soundings exceed 200 fathoms; but its mean depth is not more than 31 fathoms. The bed of this sea is traversed by several enormous banks or elevations, of which the greatest is the Dogger Bank (which see). The shores of the sea are for the most part low, except in Scotland and Norway. They present numerous estuaries and other inlets, and are studded with numerous important towns, the sea being the highway for an immense maritime traffic. The fisheries, especially of herring, cod, ling, haddock, flat-fish, etc., are exceedingly valuable. The rise and fall of the tide is very great at certain places. The navigation, on account of sand-banks, winds, fogs, etc., is rather dangerous, but numerous lighthouses help to render it safer. There are many islands along the coasts of Holland, North Germany, Denmark, and Norway.

North Sea Canal (called in Holland the Amsterdam Canal), a ship canal that connects Amsterdam with the North Sea, running east and west across the narrow neck of land that unites North Holland to the

rest of the kingdom, and of great commercial value. See *Amsterdam*.

North Shields. See *Shields*.

North-star, the north polar star, the star *a* of the constellation Ursa Minor. It is close to the true pole, never sets, and is therefore of great importance to navigators in the northern hemisphere.

North Star, Order of, a Swedish order of knighthood, established in 1748 mainly as a recognition of scientific services.

North Sydney, a town of Cape Breton, Nova Scotia, 18 miles N. W. of Sydney. Has coal mining industries. Pop. 5418.

North Tarrytown, a village in Westchester County, New York, adjoining Tarrytown. It was settled in 1680 and incorporated in 1874. Pop. 5027.

North Tonawanda (ton-a-wän'da), a city of Niagara Co., New York, on the Ningara River and Erie Canal, opposite Tonawanda. It has a fine harbor and a large trade in lumber, and manufactures lumber, iron bolts and nuts, boilers and engines, chemicals, radiators, etc. Pop. (1910) 11,955; (1920) 15,482.

North Toronto, a suburb of Toronto, Ontario. Pop. (1911) 5362.

Northumberland (north' um-bèr-land), a northern maritime county of England, bounded south and southwest by the counties of Durham and Cumberland; east by the North Sea, and north and northwest by Scotland. Area, 2016 sq. miles. The highest hills, the Cheviots, on the northwest border, towards Scotland, are admirably suited for pasture lands, and are extensively used for feeding the breed of sheep to which they give their name. Coal-measures occupy an area of 180 square miles, and yield immense quantities of coal; lead, iron, limestone, and freestone are also wrought. Arable and stock husbandry are both prosecuted with success, and the short-horned cattle mostly reared are much prized. The chief industries include shipbuilding and rope-making; forges, foundries, iron, hardware, and machine works, chemical works, potteries, glass-works, etc. The coast abounds in cod, ling, haddock, soles, turbot and herrings. Pop. 697,014.

Northumbria (north-um'bri-a), one of the seven Saxon kingdoms of Britain, which extended from the Humber to the Forth, and was bounded on the west by the kingdoms of Strathclyde and Cumbria. It was founded by Ida, an Anglian chief, in 547, and during the eighth century it was the home of Bede, Alcuin, Egbert, and other great scholars. It was the scene of important events in English history till its final conquest by William I.

Northwestern University, founded in 1851, a co-educational institution under the auspices of the Methodist Episcopal Church. Its college of liberal arts and school of music are at Evanston, Ill., its schools of law, medicine, pharmacy, dentistry, and oratory at Chicago, and its theological department is the Garrett Biblical Institute. It had in 1914, 427 instructors, 4882 students, and a library of 184,000 volumes.

Northwest Passage, a passage for ships from the Atlantic Ocean into the Pacific by the northern coasts of the American continent, long sought for, and at last proved to exist. It was traversed by Roald Amundsen during 1903–06.

Northwest Territories, formerly that portion of northwestern Canada outside the provinces of Ontario, Quebec, Manitoba and British Columbia, originally the Hudson Bay Territory; with an area estimated at over 2,600,000 sq. miles. Regina was the seat of government. The Yukon district was separated from the territories in 1898. The southern part of the territory, divided into the districts of Assiniboia, Saskatchewan, Alberta and Athabasca, was converted in 1905 into the two provinces of Alberta and Saskatchewan. The remainder was divided into the districts of Keewatin, Ungava, Franklin and Mackenzie. In 1912 that part of the Northwest Territories east of Hudson Bay and known as Ungava was incorporated in the province of Quebec, and its name changed to New Quebec. At the same time, that part of Keewatin south of 60° N. lat. was divided between the provinces of Ontario and Manitoba. At present, therefore, the Northwest Territories consist of all of that part of Canada which is north of the parallel of 60° N. lat., and between Hudson Bay on the east and the Yukon district on the west. The Territories are administered by a commissioner assisted by a council of four members, all appointed by the governor-general-in-council. There are many lakes and rivers, the former including Slave Lake, Great Bear Lake, etc.; and the latter portions of the Laird, Slave, Coppermine and Mackenzie. Pop. (1911) 17,196. (See *Canada*.)

North Yakima (yak'i-ma), a city, seat of Yakima Co., Washington, 4 miles from Yakima. It

has many lumber and saw mills. Now known as Yakima. Pop. 18,539.

Northwich (nôrth'wich), a town in Cheshire, 15 miles northeast of Chester, with numerous brine springs and extensive mines of rocksalt. Pop. 18,151.

Norton (nor'ton), CAROLINE, an English poetess and novelist, grand-daughter of Richard Brinsley Sheridan; born in 1808; died in 1877. She married in 1829 the Hon. George C. Norton; but the marriage did not prove a happy one, and from 1836 she lived apart from her husband. After the death of the latter, in 1875, she married Sir W. Stirling-Maxwell.

Norton, CHARLES ELLIOT, author, was born at Cambridge, Massachusetts, in 1827; died in 1908. He was graduated at Harvard, traveled extensively in the east, and in 1864-68 was an editor of the *North American Review.* He became professor of art history at Harvard in 1874. He wrote *The New Life of Dante, Church Building in the Middle Ages in Italy, The Divine Comedy of Dante,* etc.

Norumbega (nor-um-bē'ga), the name given to a portion of the eastern coast of North America by early explorers. It has been associated with *Norvegr* (Norway), and the section so named is presumed to have been either the Hudson River Valley or the Charles River near Watertown, Mass.

Norwalk (nor'wąk), a city, county seat of Huron County, Ohio, half-way between Cleveland and Toledo, Ohio. It has railroad shops, steel mills, and manufactures of pianos, autotops, and windshields, etc. Pop. 7379.

Norwalk, a city of Fairfield Co., Connecticut, on Norwalk River, 14 miles S. W. of Bridgeport. It has various academic institutions and a variety of manufactures. It is a summer resort, being a convenient place of summer residence for New York merchants. Pop. (1910) 24,211; (1920) 27,700.

Norway (nôr'wā; Norwegian, NORGE), a country in the north of Europe, bounded on the notheast by Russian Lapland, and east by Sweden, and washed on all other sides by the sea—by the Arctic Ocean on the north, the Atlantic and the North Sea on the northwest and west, and the Skager-Rack on the south. It is about 1080 miles in length, and its greatest breadth is about 275 miles, but towards the north it narrows so much as to be in some places not more than 20 miles; area, 124,495 square miles, or rather more than the British Isles. The country is divided into twenty prefectures, of which the capital Christiania forms one, and the city of Bergen another. Other important towns are Trondhjem, Stavanger and Drammen. Pop. 2,650,000.

Physical Features.—The coast consists chiefly of bold precipitous cliffs, and is remarkable both for the innumerable islands by which it is lined, and the bays or fiords which cut deeply into it *in all* directions. The surface is very *mountainous,* particularly in the west *and* north. Very commonly the mountain masses assume the form of great plateaus or tablelands, called *fjelds* or *fields,* as the Dovre Fjeld, Hardanger Fjeld, etc. The highest summits belong to the Sogne Fjeld, a congeries of elevated masses, glaciers, and snowfields in the center of the southern division of the kingdom, where rise Galdhoepig (8400 feet), the Glitretind (8384), and Skagastölstind (7879). Immense snowfields and glaciers are a feature of Norwegian scenery. The few important rivers that Norway can claim as exclusively her own have a southerly direction, and discharge themselves into the Skager-Rack; of these the chief are the Glommen (400 miles), and its affluent, the Lougen. The most important river in the north is the Tana, which forms part of the boundary between Russia and Norway, and falls into the Arctic Ocean. Lofty waterfalls are numerous. Lakes are extremely numerous, but generally small. The principal is the Miösen Vand. The prevailing rocks of Norway are gneiss and micaslate, of which all the loftier mountains are composed. The most important metals are iron, copper, silver and cobalt, all of which are worked to a limited extent. The climate of Norway is on the whole severe. The harbors on the west, however, are never blocked up with ice; but in places more inland, though much farther south, as at Christiania, this regularly happens. The forests are estimated to cover about a fifth of the whole surface, and form a very important branch of national wealth. The principal forest tree is the pine. The oak forms fine forests in the south; the birch is the most northerly tree. Only about 1000 sq. miles is under the plough. The chief cereal crop is oats. Barley ripens at 70° of latitude; rye is successfully cultivated up to 69°; oats to 38°; but wheat not beyond 64°, and that only in the most favorable seasons. Potatoes are grown with success even in the far north. The farms are generally the property of those who cultivate them, and commonly include a large stretch of mountain pasture, often 40 or 50 miles from the

main farm, to which the cattle are sent for several months in summer. The rearing of cattle is an extensive and profitable branch of rural economy. The horses are vigorous and sure-footed, but of a diminutive size; the ponies are among the best of their kind, and are often exported. The reindeer forms the principal stock in the extreme north. Among the larger wild animals are the wolf, bear, elk, deer. The fisheries of Norway are of very great value; they include the cod, herring, mackerel, salmon, shark, walrus, seal and lobster, the cod and herring fisheries being by far the most important. The rivers and lakes abound with salmon and salmon-trout, and make Norway one of the best angling countries in the world. Manufactures include cotton, woolen, flax and silk tissues. Distilleries, brickworks, saw and flour mills are numerous; and there are foundries machine works, match works, tobacco factories and sugar refineries. The export trade includes fish, timber, wood-pulp, whale and sea oil, metals, skins, feathers, furs, matches, etc. The chief imports are grain, textile goods, wool, sugar, coffee, tobacco, wine, brandy, petroleum, etc.; chief trade is with Britain and Germany; Sweden, Denmark and Russia coming next. The Norwegians are famous as sailors, and the country possesses the largest mercantile navy in Europe next to Britain. Bergen, Christiania and Trondhjem are the chief ports. The monetary system is the same as that of Denmark.

Government, People, etc.—Norway is a limited monarchy, until 1905 united with Sweden as a free and independent kingdom. The king could not nominate any but Norwegian subjects to offices under the crown. On a new succession the sovereign must be crowned King of Norway at Trondhjem. The members of the legislative assembly or Storthing are elected every three years by voters who have themselves been elected by the citizens possessing a certain qualification. It subdivides itself into two chambers—one, the Lagthing, consisting of one-fourth of the members; the other, the Odelsthing, has the remaining three-fourths. The chambers meet separately, and each nominates its own president and secretary. Every bill must originate in the Odelsthing. When carried in that body it is sent to the Lagthing, and thence to the king, whose assent makes it a law. The great body of the people are Protestants of the Lutheran confession, which is the State religion. Other sects are tolerated, although government offices are open only to members of the established church. Elementary education is free and compulsory. Besides primary schools there are numerous secondary schools. There is but one university, that of Christiania. The army is raised mainly by conscription. The nominal period of service is thirteen years, five in the line, four in the *Landværn* (liable to be called to defend the country), and four in the *Landstorm* (for local defense). The navy comprises four iron-clads besides other vessels. The revenue in 1915 was $40,313,000; public debt, $97,218,000. The people are almost entirely of Scandinavian origin.

History.—In the earliest times Norway was divided among petty kings or chiefs (*jarls*), and its people were notorious for their piratical habits. (See *Northmen.*) Harold Fair-hair (who ruled from 863 to 933) succeeded in bringing the whole country under his sway, and was succeeded by his son Eric. The latter was ultimately driven from the throne, which was seized in 938 by his brother, Hako I, who had embraced Christianity in England. Magnus the Good, the son of St. Olaf and Alfhild, an English lady of noble birth, was called to the throne in 1036; and having in 1042 succeeded also to the throne of Denmark, united both under one monarchy. (See *Denmark.*) After his death the crowns of Norway and Denmark again passed to different individuals. In 1319 the crowns of Norway and Sweden became for a short time united in the person of Magnus V. Eric of Pomerania succeeded, by separate titles, to Norway, Sweden and Denmark; and in 1397 was crowned king of the three kingdoms. Sweden afterwards for a time was a separate kingdom; but the union between Denmark and Norway was drawn closer and closer, and very much to the disadvantage of the latter, which was ultimately degraded into a mere dependency of the former. The subsequent history of Norway becomes for a long period merely a part of that of Denmark. After the defeat of Napoleon by the allies in 1813 it was arranged by the treaty of Vienna in 1814 that Denmark must cede Norway to Sweden, and the result was the union of the two countries under the Swedish crown. The union was not long unaccompanied with a certain amount of friction, partly owing to the entirely democratic character of the constitution of Norway, in which country titles of nobility were abolished early in the last century. The right claimed by the king to veto absolutely bills passed by elected representatives met with an overwhelming protest by the people, the struggle

lasting until 1905. In 1891 an election held for members of the Storthing resulted in a majority for the party which advocated the appointment of separate foreign ministers and consuls for Sweden and Norway, and at every subsequent election this majority was increased, Sweden persistently refusing to make concessions, Norway formally seceded from the union early in 1905. For a time war between the two countries seemed imminent, but Sweden consented to negotiate, and a treaty was concluded sanctioning the separation. Then the Norwegian parliament selected for king Prince Charles of Denmark, and submitted the choice to popular vote. On November 25, 1905, the new king ascended the throne. See *Hakon VII.* In 1907 a treaty providing for the integrity of Norway was signed by the representatives of Norway, Great Britain, France, Germany and Russia.

Norwich (nor'ich), borough and bishop's see of England, the seat of the county of Norfolk, on the Wensum, where it joins the Yare, 98 miles N. N. E. of London. It is a picturesque old town, and with its gardens and orchards covers a large area. The cathedral, founded in 1094, was originally in the Norman style, but now exhibits also later styles. It is a fine edifice with extensive cloisters, and a lofty tower and spire 315 feet high. The castle, a noble feudal relic, still partly surrounded by earthworks and ditch, is situated on a lofty eminence, and still surmounted by its massive donjon tower in the Norman style. St. Andrew's Hall, originally the nave of the Blackfriars' Church, the Guildhall, and the bishop's palace, also deserve mention. Manufactures, of which worsted and mixed goods are the staple, are extensive, including also mustard and starch, boot and shoe making, iron working, brewing, etc. The foundation of Norwich cannot be fixed earlier than 446. Rising to the position of capital of the Kingdom of East Anglia, it had, by the middle of the tenth century, become a large and wealthy town; but in 1002 it was laid in ashes by the Danes. Shortly after rebuilt by the Danes themselves, it had become in the eleventh century a large and populous place. In 1296 it began to send representatives to parliament. In 1328 Edward III made it a staple town for the counties of Norfolk and Suffolk, and induced great numbers of Flemings to settle in it. Pop. (1911) 191,418.

Norwich, a village, capital of Chenango County, New York, on the Chenango River, 42 miles N. E. of Binghamton. It has railroad shops, blast furnaces, and manufactures of hammers, silos, knit goods, wire guards, wood work, etc. Pop. (1920) 8268.

Norwich, a city, semi-capital of New London Co., Connecticut, on the Thames River, 13 miles N. of New London. The falls of the river here afford extensive water power. It has manufactures of vacuum bottles, cotton and woolen goods, paper and leather, machinery, cutlery, firearms, etc. The city was first settled in 1656. Pop. (1910) 20,367; (1920) 22,304.

Norwood, a town (township), of Norfolk Co., Massachusetts, 14 miles S. S. W. of Boston. It has tanneries, printing ink works and railroad repair shops. Pop. 12,627.

Norwood, a village of Hamilton Co., Ohio, 10 miles N. E. of Cincinnati, of which it is a suburb. It manufactures hardware and wood specialties, paper goods, cards, carriages, etc. Pop. (1910) 16,185; (1920) 24,966.

Nose (nōs), the organ in man and the higher animals exercising the olfactory sense, or that of smell, and concerned through its apertures or passages in the function of respiration and in the production of voice. The bones of the nose comprise the boundaries of the nasal *fossæ* or cavities, which open in front in the nasal apertures, and behind into the pharynx or back part of the mouth. The front nostrils, or openings of the nose, are in the skeleton of an oval or heart shape, while the openings of the posterior nostrils are of a quadrilateral form. The bones which enter into the entire structure of the nose number fourteen. In addition there are certain cartilaginous pieces which assist in forming the structure of the nose, lateral cartilages on either side, and a cartilaginous septum in the middle between the two nostrils. There is also a bony septum which unites with the cartilaginous septum to form the complete partition of the nose. Several special muscles give a certain mobility to the softer parts of the organ. The nostrils and nasal cavities are lined by the mucous membrane (*pituitary* membrane) richly furnished with arteries and veins covered with a copious mucous secretion which keeps it in the moistened state favorable to the due exercise of the function of smell. The proper nerves of smell, the *olfactory* nerves, form the first pair of cerebral nerves or those which take origin from the cerebrum; while the nerves of common sensibility of the nose belong to the fifth pair of cerebral nerves. The olfactory nerves are distributed in the mucous membrane of either side in the form of a sort of

thick brush of small nerve fibers. The study of the comparative anatomy of the nasal organs shows that man possesses a sense of smell greatly inferior in many instances to that of the lower animals. The distribution of the olfactory nerves in man is of a very limited nature when compared with what obtains in such animals as the dog, sheep, etc. All vertebrates above fishes generally resemble man in the essential type of their olfactory apparatus. In most fishes the nostrils are simply shut or closed sacs, and do not communicate posteriorly with the mouth. The proboscis of the elephant exemplifies a singular elongation of the nose, in which the organ becomes modified for tactile purposes. In the seals and other diving animals the nostrils can be closed at will by sphincter muscles or valvular processes. The most frequent diseases or abnormal conditions which affect the nose comprise congenital defects, and tumors or polypi.

Nosology (nos-ol-ō'ji; from the Greek *nosos*, disease), in medicine, that science which treats of the systematic arrangement and classification of diseases, with names and definitions, according to the distinctive character of each class, order, genus and species. Many systems of nosology have been proposed at different times, but that of Dr. William Farr has been very generally adopted as practically useful. By this system all diseases are classed under the heads of (1) Zymotic Diseases, including fevers and all diseases that may be attributed to the introduction of some ferment or poisonous matter into the system; (2) Constitutional Diseases, as gout, rheumatism, cancer, scrofula, consumption, etc.; (3) Local Diseases, as diseases connected with the nerves, circulation, digestion, respiration, urinogenital system, skin, etc.; and (4) Development Diseases, as malformations, special diseases of women, diseases connected with childhood or old age, etc.

Nossi-bé (nos-sē-bā'), an island off the northwest coast of Madagascar, belonging to France. It is about 14 miles long by 8 miles broad, has a mountainous surface, and appears to be of volcanic origin. It is very fertile, and has a population of (1902) 9291. Rice, maize, manioc, and bananas are the principal products, and the sugar-cane and the coffee-plant are successfully cultivated. It has a splendid harbor.

Nossi Ibrahim, or SAINTE MARIE, an island on the east coast of Madagascar, 33 miles in length, with an average breadth of 12 miles, separated from the island of Madagascar by a channel 5 miles in width. It has been a French possession definitely since 1815. It is neither fertile nor healthy. Pop. 7654.

Nostalgia. See *Homesickness.*

Nostoc (nos'tok), a genus of green-spored gelatinous algæ, frequent especially in sandy soils and immediately after rain in summer, and vernacularly called *witches' butter, fallen stars,* etc. Many of the species are edible, the *N. edule* of China being a favorite ingredient in soup.

Nostradamus (nōs-tra-dā'mus), true name MICHEL DE NOSTREDAME, a French physician and astrologer, born in 1503; died in 1566. He belonged to a Jewish family. He studied first at Avignon, and afterwards at the medical school of Montpellier. After taking his degree he acted for some time as a professor, but afterwards settled as a medical practitioner at Agen, and finally, after traveling in Italy, at Salon, near Aix, about 1544, where he wrote his famous *Prophéties* or astrological predictions written in rhymed quatrains. They obtained great success, although many condemned their author as a quack. Catharine de' Medici invited him to court to cast the horoscope of her sons; the Duke of Savoy traveled to Salon for the express purpose of visiting him, and on the accession of Charles IX he was appointed royal physician. In 1550 he published an almanac containing predictions about the weather, the first of a numerous family of such productions.

Nota (nō'tâ), ALBERTO, an Italian dramatic poet, born in 1755; died in 1847. Of his numerous comedies, *La Fiera,* a graphic and amusing description of manners, is perhaps the best. Many of them have been translated into French, Spanish, German, etc.

Notables (nō'ta-blz), in French history, a body consisting of noblemen, archbishops, high legal functionaries, magistrates of cities, etc., appointed and convoked from time to time by the king, as being a more pliant instrument than the states-general. The first assembly of notables of any importance was in 1558. For long there had been no meeting, but the troubles preceding the revolution led to the notables being assembled in 1787. A second meeting was held in November, 1788, to consult on the manner of assembling the States-general; but soon after everything was overturned by the revolution.

Notary (nō'ta-ri), an officer authorized to attest contracts or writings, chiefly in mercantile matters,

to make them authentic in a foreign country; to note the non-payment of foreign bills of exchange, etc. Often called a *Notary Public.*

Notation, ARITHMETICAL, ALGEBRAIC, CHEMICAL, MUSICAL. See *Arithmetic, Algebra, Chemistry, Music.*

Note (nōt), in music, a character which, by its place on the staff, represents a sound, and by its form determines the relative time or continuance of such sound. See *Music.*

Not Guilty, is the general issue or plea of the accused in a criminal action. When a prisoner has pleaded not guilty he is deemed to have put himself forward for trial, and the court may order a jury for the trial of such person accordingly. Should he refuse to plead the court may direct the proper officer to enter a plea of not guilty on his behalf. On an indictment for murder a man cannot plead that it was in his own defense, but must answer not guilty; the effect of which is, that it puts the prosecutor to the proof of every material fact alleged in the indictment, and it allows the prisoner to avail himself on any defensive circumstance as fully as if he had pleaded them in a specific form. In England and the United States a jury can only give a verdict either of guilty or not guilty, and the latter often really means that there is not sufficient evidence to convict. In such circumstances the verdict in Scotland would be 'not proven'; a verdict of not guilty in that country meaning that the accused is entirely innocent of the charge alleged.

Noto (nō'tō), a town of Sicily, in the province of Syracuse, on the left bank of the Noto, near its mouth in the Ionian Sea. It was a place of great strength under the Saracens, and one of the most agreeably situated and best-built towns in the island. Pop. 22,564.

Notochord (nō'tō-kord), in animal physiology, a fibro-cellular rod which is developed in the embryo of vertebrates immediately beneath the spinal cord. It is persistent in the lower vertebrates, but in the higher is replaced in the adult by the vertebræ, which are developed in its surrounding sheath. It is often spoken of as the *chorda dorsalis.*

Notornis (nō-tor'nis), a genus of grallatorial or wading birds, found inhabiting the South Island of New Zealand. It was first known to science by the discovery of fossil remains, but subsequently the genus was found to be still represented by living forms. The Notornis is most nearly allied to the Coots. It is, however, of larger size than these birds, and differs from them in the rudimentary nature of the wings.

Nototherium (not-ō-thēr'i-um), an extinct genus of marsupial or kangaroo-like animals, the fossil remains of which are found in deposits of the Upper Pliocene age in Australia. The *Nototherium Mitchelli* is a described species of this extinct genus.

Not Proven, in Scotch law, a verdict returned by a jury when there is not sufficient evidence to convict the prisoner at the bar, while there is some apparent foundation for the charge. Its practical effect is equivalent to a verdict of 'not guilty' (but with an essential difference—see *Not Guilty*), and the accused cannot be tried afterwards for the same offense.

Notre Dame (nō-tr dām; French, 'Our Lady'), a title of the Virgin Mary, is the name of many churches in France, and particularly of the great cathedral at Paris, which was founded in the twelfth century, and forms a prominent object in the city.

Nottingham (not'ing-am), a town near the middle of England, capital of the county of same name, on the Leen, near its junction with the Trent, 110 miles northwest of London. It occupies a picturesque sight overlooking the Vale of Trent, and has one of the finest and largest market places in the kingdom. The castle, which crowns the summit of a rock, rising 133 feet above the level of the Leen, was originally built by William the Conqueror as a means of overawing the outlaws frequenting the recesses of Sherwood Forest. Dismantled during the Protectorate, it subsequently became the property of the Duke of Newcastle, who in 1674 erected a large mansion on part of the site. This, after being partly burned in riots connected with the reform movement in 1831, now contains the Midland Counties Art Museum, free library, etc. The principal educational and literary institutions are the University College and Technical School, high-school for boys, the Blue-coat School, the school of art, the People's Hall, and the Mechanics' Institute. An arboretum covering 18 acres is a feature of the town. The staple manufactures are hosiery and lace, the latter being a sort of specialty. There are also manufactures of cotton, woolen, and silk goods, and of articles in malleable and cast-iron. Nottingham was a place of importance in Anglo-Saxon times, and was twice or thrice taken by the Danes. Charles I raised his standard here in 1642, and next year the town and castle were taken by the Parliamentar

lans. Serious riots, occasioned by the introduction of machinery, took place in 1811-12 and 1816-17. Pop. 259,942.— NOTTINGHAMSHIRE, also called NOTTS, is an inland county, bounded north by York, east by Lincoln, south by Leicester, and west by Derby. Area, 826 sq. miles. The general surface, with exception of the Vale of Trent, is undulating. The principal river is the Trent, with its affluents, the Soar and Idle. The greater portion of its area is composed of rocks of the Permian and New Red Sandstone systems. The chief mineral is coal. The soil is generally extremely fertile. The crops usually cultivated are wheat, rye, barley, oats, beans and peas. The manufactures include lace, hosiery, machinery, silk and cotton spinning, bleaching, coal-mining, iron and brass founding, glove-making, etc. Pop. 604,077.

Nottingham, HENNAGE FINCH, FIRST EARL OF, was the son of Heneage Finch, recorder of the city of London, and was born in 1621; died in 1682. He was an ardent royalist, was called to the bar in 1645, and at the Restoration was appointed solicitor-general, in which capacity he signalized his zeal in the prosecution of the regicides. In 1661 he was elected member for the University of Oxford, and obtained a baronetcy, and six years afterwards took a prominent part in the impeachment of the Earl of Clarendon. In 1670 he became attorney-general, and in 1675 he obtained the chancellorship. In 1681 his services were rewarded with the earldom of Nottingham. Dryden has handed down to posterity his portrait in *Absalom and Achitophel*, under the character of *Amri*.

Notturna. See *Nocturne*.

Noukha. See *Nucha*.

Nouméa (nō-mā'â; also called PORT DE FRANCE), is the chief settlement in the French penal colony of New Caledonia (which see). Pop., besides convicts and soldiers, 6968.

Noumenon (n o u' me-non; pl. NOUMENA), in Kant's philosophy, an object conceived by the understanding or thought of by the reason, as opposed to a *phenomenon*, or an object such as we represent it to ourselves by the impression which it makes on our senses. The *noumenon* is an object in itself, not relatively to us.

Noun (from the Latin *nomen*, name), in grammar, a word that denotes any object of which we speak, whether that object is animate or inanimate, material or immaterial. Nouns are called *proper* or *meaningless* when they are the names of individual persons or things, as George, Berlin, Orion; *common*, when they are the name of a class of things, as book, page, ball, idea, emotion; *collective*, when they are the names of aggregates, as fleet, army, flock, covey, herd; *material*, when they are the names of materials or substances, as gold, snow, water; *abstract*, when they are the names of qualities, as beauty, virtue, grace, energy. Some of the older grammarians included both the noun and the adjective under the term *noun*, distinguishing the former as *noun-substantive* and the latter as *noun-adjective*.

Noureddin Mahmoud, MALEK-AL-ADEL, one of the most distinguished of the Moslem rulers of Syria, succeeded his father as emir of Aleppo in 1145. On attaining power he proceeded to grapple with the Christians, and inflicted a disastrous defeat upon them under the walls of Edessa, taking that city by storm. This disaster to the Christian arms occasioned the second crusade. Noureddin now attempted to expel the Christians from Palestine, and before 1151 all the Christian strongholds in Syria were in his possession. An illness, however, which prostrated him in 1159, enabled the Christians to recover some of their losses; and when well enough to take the field he suffered defeat at the hands of Baldwin, king of Jerusalem. Afterwards, however, he overthrew the Christian princes of Tripolis and Antioch, making prisoners of them both. Subsequently Noureddin overran Egypt, and was invested with the governorship of that country and of Syria. He died at the height of his success in 1174.

Novalis (nō-vâl'is). See *Hardenberg, Friedrich von*.

Novara (nō-vā'ra), a town of Northern Italy, capital of province of same name, beautifully situated between the Agogna and Terdoppia, 52 miles E. N. E. or Turin. Its rice and grain markets are the most important in Piedmont. Novara is famous for the battle fought there on March 23, 1849, between the Sardinians and Austrians, in which the former were completely defeated, and Charles Albert induced in consequence to abdicate in favor of his son Victor Emmanuel. Pop. 54,571.

Nova Scotia (n ō' v ā s k ō' s h i-ā), a province of the Dominion of Canada, consisting of a peninsular portion properly called Nova Scotia, and the Island of Cape Breton, which is separated from the mainland by the Strait or Gut of Canso. It is bounded on the

north by Northumberland Strait and the Gulf of St. Lawrence; northeast, south, and southeast by the Atlantic; west by the Bay of Fundy; and north by New Brunswick, with which it is connected by an isthmus only 11 miles broad (traversed by a ship railway); area, 20,907 square miles. Of the whole about 5,000,000 acres are fit for tillage. The southeastern coast is remarkable for the number and capacity of its harbors. There are no mountains of magnitude, but ranges of hills traverse the peninsula on the northwest side. There are a number of lakes, but no streams of great size. The forests are extensive and valuable. There is much beautiful scenery, and the climate is the most equable in Canada. The wild animals include bear, foxes, moose, caribou, otter, mink, etc., and excellent sport may be had. The minerals are also valuable. Granite, trap, and clay-slate rocks predominate. Coal, with iron in combination, abounds in many places, and more than 1,500,000 tons are raised annually. Gold is also found, and is being worked. Copper ore exists, as also silver, lead, and tin; gypsum is plentiful. Petroleum has been recently discovered, and wells have been sunk in Cape Breton. Wheat, potatoes, and oats are important crops; and buckwheat, rye, barley, Indian corn, and field peas are extensively cultivated. Great quantities of hay are made, and a good deal is exported. The apple orchards of the western counties are very productive, and extend along the highway in an unbroken line for 80 miles. Apples are exported in great numbers. Cattle and sheep are raised and exported both to New Brunswick and Newfoundland. There are extensive fisheries of cod, haddock, mackerel, herrings, etc. The manufactures are comparatively unimportant, but considerable capital is invested in saw mills, flour mills, shipbuilding, tanning, etc. The foreign trade is comparatively large, more shipping being owned in proportion to population than in any other country. The imports consist principally of British and American manufactures; spirits, sugar, wines, coffee, etc. The principal articles of export are fish, timber, and coal. Education is widely diffused. There are four degree-conferring colleges or universities. The public affairs of the colony are administered by a lieutenant-governor, council, and house of assembly. The laws are dispensed by a supreme court and district courts as in Canada. Halifax, the capital, possesses one of the finest harbors in America. The province is well provided with railways and steamship service, and is frequented by summer tourists.

Nova Scotia was visited by the Cabots in 1497, and was first colonized in 1604, when French settlements were made at Port Royal, St. Croix, etc. Under the French Nova Scotia (with New Brunswick) was known as Acadia or Acadie. The French colonists were more than once almost entirely driven out by the English. In 1621 Sir William Alexander obtained from James I a grant of the country, but his attempt to colonize it proved a failure. In 1654 Cromwell took possession of the country, which remained with the English till 1667, when it was ceded to France. But in 1713 the country was again ceded to England. Its population was largely French, and in 1755, during the French and Indian war, thousands of them were forcibly removed from the country on the accusation of hostility to the English. In 1763 the island of Cape Breton was annexed to Nova Scotia, though separated from 1784 to 1820. In 1784 New Brunswick was detached. In 1867 the province became a member of the Dominion of Canada. Pop. (1911) 492,338.

Novatians (nō-vā'shanz), in church history, a sect founded in the middle of the third century by Novatianus of Rome and Novatus of Carthage, who held that the lapsed might not be received again into communion with the church, and that second marriages are unlawful. Novatianus is said to have suffered martyrdom about 255 A.D. Several writings of his remain.

Nova Zembla (nō'va zem'blà; Russian, *Novaia Zemlia*), two large islands in the Arctic Ocean, belonging to Russia, and lying north from the northeastern corner of European Russia, separated from each other by the narrow strait Matotchk in Shar; length, 635 miles; breadth, 170 miles. The coasts swarm with seals, fish, and water-fowl. The interior is covered with stunted shrubs, short grass, and moss, and is frequented by reindeer, white bears, ermines and Arctic foxes. It has no permanent inhabitants, but is visited by Russian hunters and fishers.

Novel (nov'el), a prose narrative of fictitious events connected by a plot, and involving portraitures of character and descriptions of scenery. In its present signification the term novel seems to express a species of fictitious narrative somewhat different from a *romance*, yet it would be difficult to assign the exact distinction, though the former is generally applied to narratives of everyday life and manners; while the romance deals with what is ideal, marvelous, mysterious, or supernatural. Prose fiction

written for entertainment is of considerable antiquity. Among the Greeks we find mention of a collection of stories known as the *Milesian Tales*, before which a sort of historical romance, the *Cyropædia*, had been produced by Xenophon (445-359 B.C.). There were several other Greek writers of fiction before the Christian era, but the most notable name is that of Heliodorus (which see) in the fourth century after Christ. He was followed by Achilles Tatius, Longus, and other writers of fiction. Among the Romans the chief names are Petronius Arbiter and Appuleius. The romances of the middle ages were largely metrical in form (see *Romance*), and prose fiction, as we at present understand it, is of comparatively modern growth. It had its early beginnings in the stories of Boccaccio, contained in his *Decameron* (1358). The success of this collection gave rise to numerous imitations, and since that time the development of the novel has been steadily progressive. At first we have nothing but tales of love-intrigue, as in the *Decameron*, in the *Cent Nouvelles Nouvelles* (fifteenth century), and the *Heptameron* of Margaret of Navarre (1559). But during the sixteenth and seventeenth centuries there is very marked progress, writers beginning very materially to enlarge and vary their sphere; and we now find produced the comic romance, the *picaresque* romance, or romance of amusing roguery, and the pastoral romance. The first variety is worthily represented by the *Garagantua and Pantagruel* of Rabelais (died 1553). Next in point of data comes the *Vita di Bertoldo* of Julio Cesare Croce, a narrative of the humorous and successful exploits of a clever peasant, which was as popular for two centuries in Italy as *Robinson Crusoe* in England. Some years after appeared the *Don Quixote* of Cervantes (1605), which gave the death-blow to the romance of chivalry. About the same time the first of the *picaresque* romances was given to the Spanish public. In this branch Matteo Aleman gives us in *Guzman Alfarache* a hero who is successively beggar, swindler, student, and galley slave. It gave birth to a host of similar romances, and is said to have suggested to Le Sage the idea of *Gil Blas*. The *Arcadia* of Sir Philip Sydney blends pastoral with chivalrous manners, and marks the transition to the romances of conventional love and metaphysical gallantry. In the seventeenth century prose fiction in most of its leading types had become an established form of literature in the principal languages of Europe. The full-fledged modern English novel may be said to date from Defoe. The effect of his *Robinson Crusoe, Colonel Jack, Moll Flanders* etc., is caused by the delineation and skilful combination of practical details, which give to the adventures the force of realities. The novel of everyday life and character drawing owes its first real introduction in England to the era of Richardson, Fielding and Smollett, of whom Richardson and Fielding were the most original and still rank among the masters of English fiction. The *Tristram Shandy* of Sterne displays admirable character painting, and humor deeper and finer in quality than that of his contemporaries, but can hardly be said to have any plot. Next appeared Goldsmith's *Vicar of Wakefield*, which possesses a higher moral tone than any that had preceded it. Among the best works of secondary rank may be mentioned Johnson's *Rasselas*, Walpole's *Castle of Otranto*, Madame D'Arblay's *Evelina*, and Beckford's *Vathek*. Ranking below these are the novels or romances of horrors, represented by the *Mysteries of Udolpho* and others by Mrs. Radcliffe, M. G. Lewis' *Monk*, and Maturin's *Montorio*. A return to stricter realism was manifested in Miss Edgeworth and Miss Austen, who describe domestic life with minuteness, good sense, a clear moral aim, and charming simplicity of style. In France, among the novels treating of social life in the eighteenth century the most prominent are the *Vie de Mariamne* and the *Paysan Parvenu* of Marivaux, *Manon Lescaut*, by the Abbé Prévot, the *Nouvelle Héloise*, and the *Emile* of Rousseau, containing the author's theories of love, education, religion and society. In the department of humorous and satirical fiction the palm belongs to Le Sage, author of *Gil Blas*, the *Diable Boiteux*, etc. As a writer of satirical fiction Voltaire is entitled to high rank by his *Candide, Zadig, Princesse de Babylone*, etc. The translation of the *Arabian Nights' Entertainments* by Galland (1704-17) revived the taste for the exaggerations of eastern fiction, and brought a variety of works into the field teeming with genii, magicians, caliphs, sultans, princesses, eunuchs, slaves, etc. In Germany three great names tower above all others—*Wieland; Jean Paul Richter*, whose works abound in strokes of humor, pathos, and fancy; and *Goethe*, whose novels are attempts to represent or solve the great problems of life and destiny. Popular romantic legendary tales (*Volksmärchen*) constitute a special department of German literature, which was successfully cultivated by Ludwig, Tieck, De la Motte Fouqué, Chamisso, Clemens Brentano, Zschokke, Hoffmann, Musäus, and others.

In entering upon the present epoch of the novel we meet with the name of the author of *Waverley*. Sir Walter Scott introduced a new era in the history of English fiction, and may be said to have created the modern historical novel. Since his day the British novelists are perhaps the most numerous class in the list of authors; and among the more prominent we may note Galt, Lady Morgan, Charles Lever, Mrs. Gore, Theodore Hook, Disraeli, Bulwer-Lytton, Dickens, Thackeray, James, Ainsworth, the sisters Brontë, Mrs. Trollope, Anthony Trollope, Mrs. Craik, Kingsley, Marryat, George Eliot, Wilkie Collins, Miss Braddon, Mrs. Oliphant, Miss Thackeray, Miss Yonge, Thomas Hughes, Charles Reade, William Black, Thomas Hardy, Richard Blackmore, Walter Besant, W. E. Norris, James Payn, Clark Russell, Christie Murray, Rider Haggard, R. L. Stevenson, George Meredith, Hope and F. Anstey; besides whom there are a number of clever rising men. In the United States it was not till after the revolution that the earliest attempts in prose fiction were made. The first notable adventurer in this field was Charles Brockden Brown, who was followed by J. Fenimore Cooper, Washington Irving, Edgar A. Poe, Nathaniel Hawthorne, Harriet Beecher Stowe and Oliver Wendell Holmes. After these come a younger, and in some respects a more markedly American school, represented by such names as Bret Harte, Henry James, Crawford, Howells, Cable, and various others of still more recent date. The most celebrated of the French novelists of the nineteenth century are Madame de Staël, Châteaubriand, Victor Hugo, Dumas (father and son), Balzac, Alphonse Karr, Georges Sand, Feuillet, Prosper Mérimée, Edmond About, Erckmann-Chatrian, Zola, Daudet, etc. The more noteworthy names in the German literature of fiction are those of Gutzkow, Wilibald Alexis (Wilhelm Häring), Hackländer, Spielhagen, Gottfried and Johanna Kinkel, Auerbach, Rodenberg, G. zu Putlitz, Gustav Freytag, Paul Heyse, Georg Ebers, Rosegger, and others. Among the most important novels in other languages are those in the Italian by Manzoni, in Danish by Hans Christian Andersen, in Swedish by Frederika Bremer and Madame Carlen, in Norwegian by Björson and Ibsen, in Hungarian by Maurice Jokâi, and in Russian by Ivan Tourguenieff and Tolstoï.

Novels, in the civil law, are the supplementary constitutions of some Roman emperors so called because they appeared after the authentic publications of law made by these emperors.

November (nō-vem'ber; from L. *novem*, nine), formerly the ninth month of the year, but according to the Julian arrangement, in which the year begins on January 1, November became the eleventh month, and comprised 30 days. See *Calendar*.

Novgorod (nov'gō-rōt), or VELIKI-NOVGOROD (*Great Novgorod*), a town of Russia, capital of the government of same name, on the Volkhov, near the point where it issues from Lake Ilmen, 103 miles S. S. E. of St. Petersburg. It was during the middle ages the largest and most important town of

Church at Novgorod.

Northern Europe. It is divided into two parts by the river, the Kreml or citadel and the trading town. The former contains the cathedral of St. Sophia, built after the model of St. Sophia at Constantinople; besides which there are numerous churches and several monasteries. Novgorod was the cradle of the Russian monarchy, and a monument was erected in 1864 to commemorate the thousandth anniversary of the foundation of the Russian State by Rurik. The trade and manufactures are now unimportant. Pop. 26,972.—The government has an area of 47,236 square miles. It is generally flat, a considerable portion of it being covered with lakes and marshes. The low range of the Valdai Hills enter it in the S. W. and form the principal watershed separating the basin of the Baltic from that of the Volga. The lakes are numerous,

and three of them of great extent—Vosje, Bielo-Osero, and Ilmen. A great part of the surface is covered by forests. The principal crops are rye, barley, oats, flax and hemp. Pop. 1,391,933.

Novi-Bazar (nō'vē-bä-zar'), a town of Bosnia, on the Rashka, a tributary of the Morava, 130 miles S. E. of Bosna-Serai. It has important fairs, and is in a position of strategic importance. Pop. 12,000.

Novice (nov'is) a candidate of either sex for a religious order; the *novitiate* being the time in which the novice makes trial of a monastic life before taking the final vows. The term of probation is at least one year, and may extend to two or three. The order is not bound to receive a novice at the end of his novitiate, neither can a novice be hindered to leave the order when the term of novitiate is expired. The age for commencing a monastic life is fixed by the Council of Trent at sixteen years.

Novikoff (nov'-e-kof), NICHOLAI IVANOVITCH, a Russian author, born near Moscow in 1744; died in 1818. He was for a time in the imperial service, but settling in Moscow he became editor of the *Moscow Gazette*, and founded the first circulating library in Russia. He published the *Old Russian Library*, a collection of historical documents; *Russian Biographies;* a *History of the Jesuits* (for which he was imprisoned), etc.

Novi Ligure (nō'vē-lē-gō'rā), a town of North Italy, province of Alessandria, 24 miles N. N. W. of Genoa. It was the scene of a French defeat in 1799. Pop. 17,868.

Novo-Moskovsk (nō-vō-mȧs-kovsk'), a town of Russia, government of Ekaterinoslaff, on right bank of the Samara. It has important horse and cattle fairs, tanneries, etc. Pop. 23,381.

Novo-Tcherkask (chir'kask; New Tcherkask), the chief town of the country of the Don Cossacks, in S. Russia, on the Aksai, a tributary of the Don, 40 miles from the Sea of Azov. It was founded in 1805, when the inhabitants had to remove from Old Tcherkask, on the banks of the Don, on account of inundations. It is a thriving place with a considerable trade, but the manufactures are unimportant. Pop. (1913) 67,000.

Novo-Zybkov (zib'kōf), a town of Western Russia, province Tchernigov. Pop. 11,924.

Novum Organum (nō'vum or'gan-um; 'new instrument'), the second part of Bacon's great projected work the *Instauratio Magna*, published in 1620. It is written in Latin, and along with the *Advancement of Learning* forms the foundation of the inductive or Baconian system of philosophy.

Noyades (nwȧ-yȧd; French, from *noyer*, to drown), the name given to the execution of political prisoners by drowning them, practiced during the French revolution, especially by Carrier at Nantes. One method adopted was that of crowding the victims into a boat, withdrawing a plug in the bottom, and casting them adrift in the deep water of a stream.

Noyeau (nwȧ-yō'), a cordial or liqueur of various compositions, but generally prepared from white brandy.

Noyes (noiz), ALFRED, an English poet, born in Staffordshire, September 16, 1880. He has contributed poems to various English and American periodicals, and has lectured on poetry and peace. His publications include *Collected Poems* (1910), *William Morris* (English Men of Letter Series, 1908), etc.

Noyes JOHN HUMPHREY, a religious leader, born at Brattleboro, Vermont, in 1811; died in 1886. He graduated at Dartmouth College in 1830; first studied law, and afterward divinity, at Andover and New Haven. In 1838 he founded a community of Perfectionists near Putney, Vermont, in 1847, one at Oneida, New York. He published *The Second Coming of Christ, History of American Socialism, The Way of Holiness, Home Talks*, etc.

Noyon (nwȧ'yōn), a town of northeastern France, in the department of Oise, on the Verse, near the Oise, 44 miles E. N. E. of Beauvais, and 59 miles N. E. of Paris. It is an ancient place, and has a cathedral begun in the twelfth and completed early in the thirteenth century. It was known in early times as Noviodunum Veromanduorum. The chief industries are sugar refining and the manufacture of laces, cloth, leather and chemicals. John Calvin, the famous theologian, was born here in 1509.

Noyon was the scene of bitter fighting during the European war which began in 1914. It was overrun by the Germans in their initial advance in the first year of war and held by them till the spring of 1917, when the Allies forced the Teutons to retire from their positions on the long front from Arras to Soissons. On March 17 the last troops left Noyon and the French entered what was left of the town on the following day. Noyon remained in the hands of the French till March, 1918, when the Germans began their long-

heralded great offensive on a fifty-mile front from the River Oise, near La Fere, to Arras. The attack began on March 21, and the Germans were again in possession of Noyon by March 27. In and around the town were many exquisite examples of French architecture of the Renaissance. These were destroyed by the retreating Germans in 1917. The ancient cathedral was spared, though badly battered by shells. Pop. 7277.

Nubeculæ. Same as *Magellanic Clouds.*

Nubia (nū'bi-a), a name given, in a more or less restricted sense, to the countries of Northeastern Africa, bounded north by Egypt, east by the Red Sea, south by Abyssinia, Senaar and Kordofan, and west by the Libyan Desert. With the exception of the valley of the Nile the country is generally desert. From 1822 to the revolt of the Mahdi in 1883 the country was subject to Egypt. Then, until 1898, it acknowledged the sway of the Mahdi and his successor. The victory of Kitchener in that year restored the dominion to Egypt. Suakin or Sauakin, on the Red Sea, is the only practicable port. Khartum is the most important inland town. Remains of ancient edifices occur throughout the whole extent, but chiefly below Dongola. The Nubians belong to the Arabian and Ethiopian races, who converge in the Nile basin; they are a handsome race, of dark-brown complexion, bold, frank, cheerful, and more simple and incorrupt in manners than their neighbors either up or down the river. Their language comprises various dialects of the Negro speech of Kordofan. See *Egypt, Soudan.*

Nuble (nyō'blā), an inland province of Chile, watered by the Nuble and other streams; area, 3555 square miles. This province is noted for its fine climate and fertility. Pop. about 160,000.

Nucha, or NUKHA (nō-hä'), a town of Russia, in the Caucasian government of Elizabethpol, 120 miles E. S. E. from Tiflis. It contains a fortress and palace built by Hosein Khan in 1765, and was up to 1864 a very important sericultural center. Pop. 24,811.

Nucleus, NUCLE'OLUS. See *Cell.*

Nuddea. See *Nadiyá.*

Nudibranchiata (nū-di-bran-ki-ā'-ta) the section of 'Naked-gilled' Molluscs belonging to the class of Gasteropods. They have no shells in their adult state, and the gills are completely exposed, existing for the most part as branched or arborescent structures on the back or sides of the body. The sea-lemons, sea-slugs, etc., are examples.

Nuevo Leon. See *New Leon.*

Nuggina. See *Nagina.*

Nuisance (nū'sans), a legal term used to denote whatever incommodes or annoys; anything that produces inconvenience or damage. Nuisances are defined of two kinds—*public* or *common* and *private.* Public nuisances are annoyances in the highways, bridges and public rivers; injurious and offensive trades and manufactures, which, when hurtful to individuals, are actionable, and when detrimental to public health or convenience, punishable by public prosecution, and subject to fine according to the nature of the offense. A private nuisance may be defined as an injury or annoyance to the person or property of an individual, and not amounting to a trespass, as where one projects the eaves of his house over those of his neighbor, or stops or obstructs a right of way. Whatever obstructs passage along the public ways, or whatever is intolerably offensive to individuals in their homes, constitutes a nuisance. Causing inconvenience to one's neighbors may not in itself be a nuisance at law; there must be positive discomfort or danger. It is a nuisance if a neighbor sets up and exercises any offensive trade, or keeps noisome animals near the house of another. Nuisance, whether private or public, is rather an injurious than a criminal act. The remedy at law for the injury of nuisance is by action of trespass on the cause, in which the party injured may recover a satisfaction in damages for the injury sustained. The party aggrieved has also the right to abate the nuisance by his own act; that is, he may take away or remove it, provided he commits no riot in so doing, nor occasions (in cases of private nuisance) any damage beyond what the removal of the inconvenience necessarily requires. Says Blackstone: 'The reason the law allows this summary method is because injuries of this kind require an immediate remedy, and cannot wait for the slow progress of justice.'

Nudibranchiata—*Edlis olivacea.*

Nukha (nō-kä'). See *Nucha*.

Nullification (nul-i-fi-kā'shun), a rendering void and of no effect, or of no legal effect; in American politics it indicates the doctrine of the extreme States' rights party, first propounded by Calhoun in 1828. He asserted the right of any state to declare the unconstitutionality of any federal law, and the right to withdraw from the Union should such law be enforced. An effort to put this doctrine into effect was made in 1832, by a South Carolina convention, which declared the tariff bill just enacted null and void, forbade the collection of duties within the state, and threatened to secede from the Union if an effort was made to enforce the law. President Jackson, by prompt and resolute action, checked this movement, but a compromise tariff bill was soon after passed to remove the cause of dispute.

Nullipore (nul'i-pōr), a name given to certain beautiful little plants of the genus *Melobesia*, common on coral islands. From secreting lime on their surface, and hence resembling coral, they were formerly supposed to be a kind of zoöphytes.

Numantia (nū-man'shi-ä), an ancient town of Spain, the site of which is near the town of Soria, in Old Castile. It had great natural strength, and is celebrated for its desperate resistance to the Roman power, especially in the siege by Scipio Africanus in B.C. 134-133, when it had to surrender, though most of its defenders then surviving put themselves to a voluntary death. The town was destroyed by the conqueror.

Numa Pompilius (nū'ma pom-pil'i-us), the second king of Rome, who is said to have reigned from 714 to 672 B.C. He was of Sabine origin, and was distinguished as a philosopher and legislator, though, like the other early kings, he has more a legendary than an historical existence. He was regarded as the founder of the most important religious institution of the Romans, and left writings explanatory of his system, which were burnt by order of the senate, when accidentally discovered 400 years after his time.

Number (num'bėr), a single unit considered as part of a series, or two or more of such units. An *abstract number* is a unit or assemblage of units considered independently of any thing or things that they might otherwise be supposed to represent. For example, 5 is an *abstract number* while it remains independent; but if we say 5 feet or 5 miles it becomes a *concrete number*. *Cardinal numbers* are numbers which answer the question, 'How many?' as one, two, three, etc., in distinction from *first, second, third*, etc., which are called *ordinal numbers*. A *prime number* is a number which can be divided exactly by no number except itself and unity. A number is *even* when it is divisible by two, otherwise it is *odd*. See *Arithmetic*.

Number, in grammar, that distinctive form which a word assumes according as it is spoken of or expresses one individual or several individuals. The form which denotes one or an individual is the *singular number;* the form that is set apart for two individuals in some languages (as in Greek and Sanskrit) is the *dual number;* while that which refers indifferently to two or more individuals or units constitutes the *plural number*.

Numbering-machine, a machine for impressing consecutive numbers on account books, coupons, railway tickets, bank notes, etc. One of the principal forms of the apparatus consists of discs or wheels decimally numbered on their peripheries, the whole mounted on one axle, upon which they turn freely, acting upon each other in serial order. The first wheel of the series, containing the units, is moved one figure between each impact, and when the units are exhausted the tens come into action and act in coincidence with the units; so on of the hundreds, thousands, etc.

Numbers, Book of, the fourth of the books of the Pentateuch. It takes its name from the records which it contains of the two enumerations of the Israelites, the first given in chaps. 1-4, and the second in chap. xxvi. It contains a narrative of the journeyings of the Israelites from the time of their leaving Sinai to their arrival at the plains of Moab, and portions of the Mosaic Law. Formerly the authorship was implicitly attributed to Moses, but some modern scholars resolve the book into various parts, to each of which is assigned a separate author. See *Pentateuch*.

Numeral (nū'mėr-al), a figure or character used to express a number; as the Arabic numerals, 1, 2, 3, etc., or the Roman numerals, I, V, X, L, C, D, M, etc. See *Arithmetic*.

Numeration (nū-mėr-ā'shun), the art of expressing in characters any number proposed in words, or of expressing in words any number proposed in characters. The chief terms used for this purpose are the names of the digits from *one* to *ten*, a *hundred*, a *thousand*, a *million*, etc. The term *billion* is of uncertain use; in Britain it is a mil-

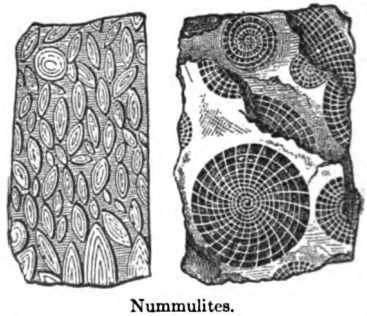
lion of millions; in France, America, etc., a thousand millions.

Numidia (nū-mid'i-ȧ), an ancient country of North Africa, corresponding roughly with modern Algeria. It was divided among various tribes, but after the second Punic war it was united under Massinissa, and several of its rulers became noted in Roman history. In B.C. 46 it became a Roman province.

Numidian Crane. See *Demoiselle.*

Numismatics (nū-mis-mat'ikz), or NUMASMATOLOGY, the science of coins and medals, the study of which forms a valuable and important adjunct to that of history. The word *coin* is in modern times applied to those pieces of metal struck for the purpose of circulation as money; while the word *medal* signifies pieces of metal similar to coins not intended for circulation as money, but struck and distributed in commemoration of some person or event. Ancient coins, however, are often termed *medals.* They are of gold, silver, bronze, electrum, or billon, and in ancient times served not only for the purpose of a currency, but as chronicles of political events, and abstracts of the times. It is also from coins alone that we derive our knowledge of some of the most celebrated works of ancient art, particularly of ancient statuary. The parts of a coin or medal are: the *obverse* or *face* containing generally the head, bust, or figure of the sovereign or person in whose honor the medal was struck, or some emblematic figure relating to him; and the *reverse,* containing various figures or words. The words around the border form the *legend,* those in the middle or field the *inscription.* The lower part of the coin, separated by a line from the figures or the inscription, is the *basis* or *exergue,* and contains the date, the place where the coin was struck, etc. Coins are usually arranged in three grand classes: Greek and Roman coins, mediæval and modern European coins, and Oriental coins. Greek coins are again classed in three divisions: (1) civic coins, and regal without portraits; (2) regal coins bearing portraits; (3) Græco-Roman coins. Roman coins are divided into (1) republican, (2) imperial. In ancient, as in modern times, while the coins of empires or kingdoms were (at least in later times) distinguished by the head of the reigning prince, those of free states were distinguished by some symbol. Thus, Egypt was distinguished by a sistrum, an ibis, a crocodile or a hippopotamus; Arabia by a camel; Africa by an elephant; Athens by an owl; Syracuse and Corinth by a winged horse. There were also a number of symbols having a general signification. Thus, a patera signified a libation, and indicated the divine character of the person holding it in his hand; the shaft of a spear denoted sovereign power; an ensign on an altar, a new Roman colony; and so forth. Mediæval coins include the Byzantine, the coins of the various European states from the fall of Rome to the accession of Charlemagne; the Carlovingian currency from Charlemagne to the fall of the Swabian house (1268); early Renaissance to 1450; and classical Renaissance from then till 1600. Modern coins are classed geographically and chronologically. Oriental coins are those of Ancient Persia, Arabia, Modern Persia, India, China, etc.

Nummulite (num'ū-lit; Latin, *nummus,* money; Greek, *lithos,* stone), a name common to the members of an extensive class of fossil polythalamous foraminifera, having externally somewhat the appearance of a piece of money (hence their name), without any apparent opening, and internally a spiral cavity divided by partitions into numerous chambers communicating with each other by means of small openings. They vary in size from less than ⅛ inch to 1½ inch or more in diameter. Num-



Nummulites.

mulites occupy an important place in geology, on account of the prodigious extent to which they are accumulated in the lower tertiary (Eocene) strata. They are often piled on each other nearly in as close contact as the grains in a heap of corn. They occur so abundantly in some parts of the Eocene formation that the name of *nummulitic* limestone is given to

the strata so characterized. This series is characteristic of the Eastern Hemisphere, often attains a thickness of several thousand feet, and extends from the western shores of Europe and Africa through Asia to the east of China. The pyramids of Egypt are constructed of a stone largely composed of nummulites.

Nun, a word of unknown origin, but supposed to be connected with a Coptic word signifying 'pure,' applied in the Roman Catholic Church to a female who retires from the world, joins a religious sisterhood, takes upon herself the vow of chastity and the other vows required by the discipline of her convent, and consecrates herself to a life of religious devotion. Nearly all the masculine orders or rules had corresponding feminine institutions, while there were also numerous independent orders of nuns. At present the number of nuns is largely in excess of that of monks. The first nunnery is said to have been that founded by a sister of St. Anthony about A.D. 270; and the first in England was founded at Folkestone by Eadbald, king of Kent, in 630.

Nun, one of the mouths of the river Niger.

Nunc Dimittis ('now thou lettest depart'), the first two words of the Latin version of the canticle of Simeon given in Luke ii. 29-32, and used as the designation of the whole canticle, which forms part of the evening service in the Book of Common Prayer.

Nuncio (nun'shi-ō), an ambassador of the first rank (not a cardinal) representing the pope at the court of a sovereign entitled to that distinction. A papal ambassador of the first rank, who is at the same time a cardinal, is called a legate. The title of *internuncio* is given to an ambassador of inferior rank, who represents the pope at minor courts. Formerly the papal nuncios exercised the supreme spiritual jurisdiction in their respective districts. But now, in those Catholic kingdoms and states which hold themselves independent of the court of Rome in matters of discipline, the nuncio is simply an ambassador.

Nuncupative Will, one made by the verbal declaration of the testator, and depending merely on oral testimony for proof though afterwards reduced to writing. Nuncupative wills are now abolished, but with a proviso that any soldier in actual military service, or any mariner or seaman at sea, may dispose of his personal estate by an oral testament before a sufficient number of witnesses.

Nuneaton (nun'ē-tun), a town in England, in the county of Warwick, on the left bank of the Anker, 17 miles N. N. E. of the town of Warwick. It has two endowed schools, and the industries include woven worsted goods, wool and skin dressing, iron working, toolmaking, etc. The ribbon manufacture, formerly important, has declined. Coal and iron are found in the vicinity. Pop. 37,083.

Nunez de Balboa. See *Balboa.*

Nuphar (nū'fâr), the generic name of the yellow water-lilies, nat. order Nymphæaceæ.

Nuraghi (nu-rä'gē), the name given to certain ancient structures peculiar to Sardinia, resembling in some respects the 'burghs' or 'brochs' (which see) found in some of the northern parts of Scotland. They are conical structures with truncated summits, 30 to 60 feet high and 35 to 100 feet diameter at the base, built of unhewn blocks of stone without mortar. They generally contain two or three conically vaulted chambers one above the other, connected by a spiral staircase in the thickness of the wall, and are built either on natural or artificial eminences. Their purpose is not known, but they are probably prehistoric monumental tombs.

Nureddin. See *Noureddin.*

Nuremberg (nū'rem-berg; Ger. *Nürnberg*, nûrn'berh), a town in Bavaria, 93 miles N. N. W. of Munich. It is surrounded by well-preserved ancient walls having numerous massive towers and gateways, and the whole inclosed by a dry moat. The walls have of late been breached in several places to afford access from the extensive and rapidly increasing suburbs. Within the walls it is one of the best preserved specimens of a mediæval town in existence. The houses are generally lofty and picturesque, and many of them have three ranges of dormer windows on their steep roofs. The town, which is very densely built, rises gradually to a height on the north side, on which the old castle is situated. The Pegnitz, traversing the town from east to west, divides it into two nearly equal parts—the north and the south, which communicate by numerous bridges. It contains a large marketplace and several interesting churches, among the finest of which are the Gothic churches of St. Lawrence and St. Sebaldus, both dating from the thirteenth century. The former among its treasures of art contains an elaborate and delicately carved ciborium

of stone in the form of a Gothic spire 65 feet high by Adam Krafft; the latter, St. Sebald's monument, the masterpiece of Peter Vischer, consisting of a rich late Gothic altar shrine and canopy in bronze adorned with numerous statues and reliefs. Other places of worship are the fourteenth century Marienkirche (Roman Catholic), and the Jewish synagogue in

Nuremberg—The Pegnitz and St. Lawrence Church.

oriental style (1867-74). The castle dates from the reign of Frederick Barbarossa (1158); part of the interior was fitted up in Gothic style (1854-56) as a royal residence. The town hall is adorned with frescoes by Albert Dürer, and a relief in stucco by Kern. The Germanic National Museum, founded in 1852 in a suppressed Carthusian monastery, a Gothic building of the fourteenth century with extensive cloisters, and recently greatly extended by the addition of the Augustinian monastery rebuilt adjoining, now ranks among the first in Germany, and is exceedingly rich in works illustrative of the arts and industries of the middle ages. It has also a library and a collection of charters. There are several fountains, the chief of which is the Schöne Brunnen, erected in 1385-96, and restored 1821-24. It is in the form of a graceful Gothic cross 63 feet in height, adorned with numerous figures; and modern statues of Dürer, Hans Sachs, Melanchthon, and other worthies. Nuremberg has extensive breweries, railway-carriage and lead-pencil manufactories, and produces fancy articles in metal, carved wood, ivory, etc., chemicals, clocks and watches, cigars, playing-cards, etc. It has long been noted for its small wares, known in trade as 'Nuremberg wares,' such as toys, and small gold, silver and ivory articles, etc., which are sent to all parts of the world. Printing and bookbinding are also extensively carried on, and the hop market is the most important on the Continent. The town is celebrated, in connection with its industry, for the invention of watches. It was an independent town down to 1806, when it became a Bavarian city it has prospered first of the imperial towns to cast its lot for the Reformation. During the Thirty Years' war about 10,000 of the inhabitants perished, while Gustavus Adolphus was besieged here by Wallenstein (1632). Before the discovery of the sea passage to India, Nuremberg was the great mart of the produce of the East coming from Italy and going to the North. Several causes led to a decline; but since it became a Bavarian city it has prospered greatly, and is now the most important seat of trade and manufactures in South Germany. Pop. (1910) 332,651, three-fourths being Protestants.

Nurse, one who tends or takes care of the young, sick, or infirm; spe-

cifically a woman hospital attendant. There are now numerous institutions where active, intelligent, and physically able women are thoroughly trained for this work. The system of sending trained nurses to a seat of war originated with Miss Florence Nightingale during the Crimean war, and organizations for military nursing during war are now common to all civilized countries. See *Red Cross Societies.*

Nursery (nur'se-ri), a place where vegetables, flowering plants, and trees are raised from seed in order to be sold in their young state either for use as food or for transplantation. The advantage of having separate places devoted to this purpose consists in this, that more attention can in that case be given to the objects of culture at the time when particular care is required by them. In the case of trees there is another great advantage in the fact that they can be selected from the nursery at a stage of their growth at which it can be pretty satisfactorily determined that they are likely to thrive. Nurseries are parceled out into several plots according to the different kinds of plants or trees to be raised. One part is assigned to the ordinary culinary vegetables; others to flowering plants requiring different kinds of soil; another to forest trees with caducous leaves; another to ornamental trees and shrubs with caducous leaves; another to trees and shrubs with persistent leaves; and another to fruit trees. For the propagation of many exotic and other trees and plants a large extent of ground in a well appointed nursery is under glass. Sometimes also different parts of the nursery are allotted to the various operations, such as budding and grafting, by which trees are propagated.

Nursingpore. See *Narsinghpur.*

Nusseerabad. See *Nasirabad.*

Nut, in botany, a one-celled fruit containing when mature only one seed, and enveloped by a pericarp of a hard, woody, or leathery texture, rarely opening spontaneously when ripe. Among the best known and most valuable nuts are the hazel-nut, Brazil-nut, walnut, chestnut, hickory, pecan and cocoanut, all of which are edible. Various other kinds of nuts are used for special purposes. Thus valonia-nuts, gall-nuts (not, strictly speaking, nuts—see *Galls*), and myrobalan-nuts are used in tanning and dyeing, the last two also in ink-making; betel-nuts in making tooth-powder and tooth-paste; and coquilla-nuts and vegetable-ivory (the kernel of the nut of the Peruvian palm), being very hard and capable of taking on a fine polish, are used in making small ornamental articles of turnery.

Nutation (nū-tā'shun), in astronomy, a small subordinate gyratory movement of the earth's axis, in virtue of which, if it subsisted alone, the pole would describe among the stars, in a period of about nineteen years, a minute ellipse, having its longer axis directed towards the pole of the ecliptic, and the shorter, of course, at right angles to it. The consequence of this real motion of the pole is an apparent approach and recess of all the stars in the heavens to the pole in the same period; and the same cause will give rise to a small alternate advance and recess of the equinoctial points, by which, in the same period, both the longitudes and right ascensions of the stars will be also alternately increased or diminished. This nutation, however, is combined with another motion, viz., the precession of the equinoxes, and in virtue of the two motions the path which the pole describes is neither an ellipse nor a circle, but a gently undulating ring; and these undulations constitute each of them a nutation of the earth's axis. Both these motions and their combined effect arise from the same physical cause, viz., the action of the sun and moon upon the earth. See *Precession.*

Nutcracker (nut'kra-ker), the name of an insessorial bird which is generally referred to the crow family, and so placed as to approximate either to the woodpeckers or starlings. The *Nucifrăga caryocatactes*, or European nutcracker, is about the size of the jackdaw, but with a longer tail. It combines to a considerable extent the habits of the woodpeckers and those of the omnivorous birds. It has received the name of nutcracker from its feeding upon nuts. The *N. columbiana*, noted for the diversified beauty of its plumage, frequents rivers and sea shores in America.

Nutgalls. See *Galls.*

Nuthatch (nut'hach), the common name of birds of the genus *Sitta*. The common European nuthatch (*S. europæa*) is a scansorial bird, of shy and solitary habits, frequenting woods and feeding on insects chiefly. It also eats the kernel of the hazel-nut, breaking the shell with great dexterity. The white-bellied nuthatch of North America (*Sitta Carolinensis*) is 6 in. long; the wings 4.

These birds are found in all cold and

temperate climates, the North American species (*S. carolinensis*) being known as the white-bellied nuthatch, its color being bluish above, the under parts bluish white.

Nutley, a town in Essex County, New Jersey, 5 miles N. of Newark. Paper, silk, leather goods, etc., are made. Pop. (1920) 9421.

Nutmeg (nut'meg), the kernel of the fruit of *Myristica moschata* or *fragrans*. This fruit is a nearly spherical drupe of the size and somewhat of the shape of a small pear. The fleshy part is of a yellowish color without, almost white within, and 4 or 5 lines in thickness, and opens into two nearly

Nutmeg (*Myristica moschata*).

equal longitudinal valves, presenting to view the nut surrounded by its arillus, well known as *mace*. The nut is oval, the shell very hard and dark-brown. This immediately envelops the kernel, which is the nutmeg commonly sold in the shops. The tree producing this fruit grows principally in the islands of Banda in the East Indies, and has been introduced into Sumatra, India, Brazil and the West Indies. It reaches the height of 20 or 30 feet, producing numerous branches. The color of the bark of the trunk is a reddish-brown; that of the young branches a bright green. The nutmeg is an aromatic, stimulating in its nature, and possessing narcotic properties, very grateful to the taste and smell, and much used in cookery. Nutmegs yield by distillation with water about 6 per cent. of a transparent oil, which has a burning aromatic taste.

Nutria (nū'tri-ȧ), the commercial name for the skins of *Myapotamus coypus*, the coypou of South America. The overhair is coarse; the fur, which is used chiefly for hat-making, is soft, fine, and of a brownish-ash color.

Nutrition (nū-trish'un), the act or process by which organisms, whether vegetable or animal, are able to absorb into their system their proper food, thus promoting their growth or repairing the waste of their tissues. It is the function by which the nutritive matter already elaborated by the various organic actions loses its own nature, and assumes that of the different living tissues—a process by which the various parts of an organism either increase in size from additions made to already formed parts, or by which the various parts are maintained in the same general conditions of form, size, and composition which they have already by development and growth attained. It involves and comprehends all those acts and processes which are devoted to the repair of bodily waste, and to the maintenance of the growth and vigor of all living tissues.

Nux-vomica (nuks-vom'i-kȧ), the fruit of a species of *Strychnos* (*S. nux-vomica*), order Loganiaceæ, growing in various places in the East Indies. It is about the size and shape of a small orange, and has a very bitter acrid taste. It is known as a very virulent poison, and is remarkable for containing the veg e to-alkali *strychnia*. See *Strychnine*.

Strychnos nux-vomica.

Nyan'za. See *Albert Nyanza* and *Victoria Nyanza*.

Nyasa (ny-ȧs'ȧ), a large lake in Southeastern Africa, out of which flows the Shiré, a northern tributary of the Zambesi; discovered by Livingstone in 1859. The length of the lake is above 300 miles, and it varies in breadth from about 15 to more than 50 miles. The surface is 1522 feet above the sea level. There are missionary and trading stations in this region, and a road has been constructed between Nyasa and Tanganyika.

Nyasaland (ny-ȧs'ȧ-land), or BRITISH CENTRAL AFRICA (which see), the region adjoining Lake Nyasa, a plateau, occasionally reaching 8000 feet. The natives, over 923,000, speak Bantu languages, and seem to be a fusion of the East Coast negro, the West Coast negro and the Bushman.

Nyaya (nī'ȧ-yȧ), a system of Indian philosophy said to have been

propounded by a sage named Gautama (not the founder of Buddhism). He lived at the commencement of the second of the four ages into which the Hindus divide the whole duration of the world's existence, and his life is represented as lasting 1000 years. His philosophy inquires into the way to attain perfect beatitude, or the final deliverance of the soul from re-birth or transmigration.

Nyborg (nü'borh), a seaport in Denmark, on the east side of the island of Fynen, 17 miles E. S. E. of Odensee. It was fortified until 1869. Pop. 7790.

Nyctaginaceæ (nik-ta-ji-nā'se-ē), NYCTAGIN'EÆ, a nat. order of plants inhabiting the warmer parts of the world, typical genera of which are the *Mirabilis* or marvel of Peru (see *Mirabilis*), *Abronia*, and *Pisonia*. The roots of many of the species are fleshy, purgative and emetic.

Nycticebus (nik-ti-sē'bus), the generic name of the kukang or slow-paced loris, the typical animal of the subfamily Nycticebidæ.

Nyctipithecus (nik-ti-pi-thē'kus), a genus of American monkeys which appear to represent the lemur tribe in America. Their habits are nocturnal and their movements cat-like.

Nye (nī), EDGAR WILLIAM, humorist, born at Shirley, Maine, in 1850; died in 1896. He wrote under the name of Bill Nye, bad spelling being combined with a racy humor in his productions.

Nyiregyháza (nyĕ'red-yä-zȧ), a town of Hungary, 30 miles N. of Debreczin. It has mineral springs and salt, soda and saltpeter manufactories. Pop. 31,875.

Nyköping (nü-cheup'ing), a seaport town in Sweden, capital of Södermanlän, and at the mouth of the river Nyköping, on the Baltic, 54 miles S. W. of Stockholm. It has shipbuilding and several minor industries. Pop. 7375.

Nylghau (nil'gȧ), the *Portax picta* or *tragocamēlus*, a species of antelope as large as or larger than a stag, inhabiting the forests of Northern India, Persia, etc. The horns are short and bent forward; there is a beard under the middle of the neck; the hair is grayish-blue. The female has no horns. The nylghau is much hunted as one of the noblest beasts of the chase, the skin of the bull being in demand for the manufacture of native shields. The name nylghau literally means 'blue ox,' and has, doubtless, been applied to this animal from the ox-like proportions of its body. They are known to breed freely in confinement.

Nymegen. See *Nijmegen*.

Nymph, (nimf), a term sometimes applied to denote the *pupa* or *chrysalis* stage in the metamorphosis of insects and other animals.

Nymphæaceæ (nim-fē-ā'se-ē), a nat. order of aquatic plants containing the water lilies of various parts of the world. They are polypetalous hypogenous exogens, with the sides of the cells of the fruit covered with numerous seeds. The leaves are peltate or cordate and fleshy. The Victoria Regia is called water maize in South America. The species are mostly prized for the beauty of their flowers; as the

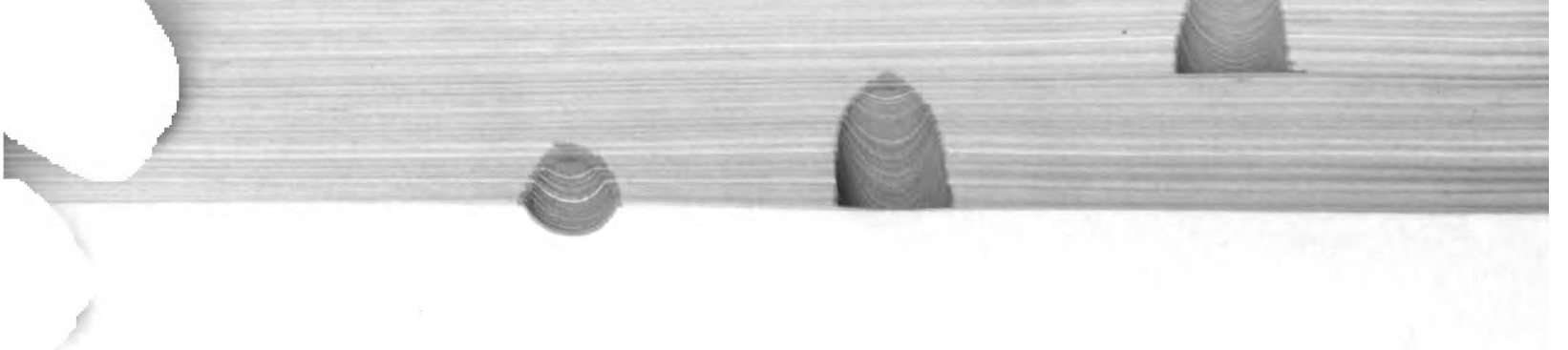
Nymphæa Lotus (white Egyptian water-lily).

Nymphæa alba, or white water lily, which grows in pools, lakes and slow rivers in Britain; the *N. cærulea*, or blue lotus of the Nile, often cultivated in gardens; the *N. Lotus*, or white lotus of the Nile; the *Nuphar lutĕa*, or yellow water lily; and the *Victoria Regia*.

Nymphs, in mythology, a numerous class of inferior divinities, imagined as beautiful maidens, not immortal, but always young, who were considered as tutelary spirits not only of certain localities, but also of certain races and families. They occur generally in connection with some other divinity of higher rank, and they were believed to be possessed of the gift of prophecy and of poetical inspiration. Those who presided over streams were called *Naiads;* those over mountains, *Oreads;* those over woods and trees, *Dryads*, and *Hamadryads;* those over the sea, *Nereids*.

Nynee Tal (nī'nē-tal), a town of British India in the United Provinces. Pop. 7609.

Nystad (nü'stad), a town and seaport in Finland, 36 miles N. W. of Abo, on the Gulf of Bothnia. A peace was concluded here between Russia and Sweden in 1721. Pop. 4044.



O

O, the fifteenth letter and the fourth vowel in the English alphabet. In English O represents six or seven sounds and shades of sound: (1) as in *note, go,* etc. (2) The similar short sound as in *tobacco.* (3) The sound heard in *not, gone.* (4) The same sound lengthened as in *mortal.* (5) The sound in *move, do, tomb, prove.* (6) The same sound but shorter as in *wolf, woman.* (7) The sound of *u* in *tub,* as in *come, done, love.* It is also a common element in digraphs, as *oo, oa, ou.*

O', in Irish proper names, a patronymic prefix corresponding to the Mac of the Highlands of Scotland; thus O'Connell means 'the son of Connell.'

Oahu (ō-ä'hō), one of the Sandwich Islands (which see). Pop. 58,504.

Oajaca, or OAXACA (ō-ä-hä'kä), a State of Mexico, on the Pacific Ocean and the Gulf of Tehuantepec; area, 35,582 square miles. It is of uneven surface, and in many parts mountainous; but is one of the most beautiful and best-cultivated districts in Mexico. Among the minerals are gold, silver, copper, quicksilver, iron, etc. Wheat, maize, indigo, cochineal, cotton, sugar, cocoa, coffee, and many fruits are produced. The only port is Huatulco. The inhabitants are chiefly Indians. Pop. 948,633.—The capital, which has the same name, stands near the river Verde, 218 miles S. S. E. of Mexico, 4800 feet above the sea. It is well built, about 2 miles in length by 1¼ miles in breadth, including the suburbs, which are full of gardens and plantations of cochineal. The inhabitants are industrious, manufacturing silk, cotton, sugar and chocolate. Pop. (1910) 38,011.

Oak (ōk), the general name of the trees and shrubs belonging to the genus *Quercus,* nat. order Cupuliferæ, having monœcious flowers, those of the males forming pendulous catkins, those of the females solitary or in clusters, and having an involucre which forms the well-known 'cup' of the fruit—the acorn. The oak from the remotest antiquity has obtained a preëminence among trees, and has not unjustly been styled the 'monarch of the woods.' In the traditions of Europe and a great part of Asia the oak appears as a most important element in religious and civil ceremonies. It was held sacred by the Greeks and Romans, and no less so by the ancient Gauls and Britons. The species of oak are very numerous, generally natives of the more temperate parts of the northern hemisphere, but found also in Java, Mexico and South America. They have alternate simple leaves, which are entire in some, but in the greater number variously lobed and sinuated or cut; evergreen in some, but more generally deciduous. The British oak (*Q. Robur*) is found in two forms or varieties, by some regarded as distinct species—*Q. sessiliflōra* and *Q. pedunculāta;* the wood of the former is heaviest and toughest, that of the latter being in favor with cabinet makers for ornamental work. (See also *Durmast.*) For more than a thousand years British ships were mainly built of common oak (*Q. Robur*). The common oak attains a height of from 50 to 100 or even 150 feet, with a diameter of trunk of from 4 to 8 feet. Noble specimens of oak trees, and some of them historically celebrated, exist in almost all parts of Britain. On the settlement of the United States oaks were found to be still more numerous there in species than in Europe, most of them yielding valuable timber. The white oak (*Q. alba*), extending from the Gulf States to Canada, is inferior in quality only to the British oak, and other species of value are the over-cup oak of the Southern States (*Q. lyrata*); the live-oak (*Q. virens*), also southern; the red-oak (*Q. rubra*), widely distributed, the black oak (*Q. nigra*); and others of less value. The dwarf chestnut oak (*Q. primoides*) and several others produce edible acorns. The oak subserves a great number of useful purposes, the wood being hard, tough, tolerably flexible, strong without being too heavy, not readily penetrated by water. Among the other chief species are the dyer's oak (*Q. tinctoria*), the bark of which is used for tanning and dyeing leather; the cork oak (*Q. Suber*), live oak (*Q. virens*), the Turkey oak (*Q. Cerris*) furnishing a

valuable timber; the valonia oak (*Q. ægilops*) whose acorn-cups are largely used in tanning; the kermes oak (*Q. coccifĕra*), the edible oak (*Q. æsculus*), yielding edible acorns; evergreen oak (*Q. ilex*). The bark of the common oak tree and of several others is preferred to all other substances for the purpose of tanning, on account of the amount of tannic and gallic acid it contains. Oak galls, morbid growths caused by insects (see *Galls*), are also much used in tanning, especially those of *Q. infectoria*. Oak bark is also used medicinally as an astringent. The name oak is sometimes popularly applied to timber of very different genera of trees; thus African teak is often called *African oak;* while in Australia the term oak is applied to some species of *Casuarina*. What is known as *green oak* is a condition of oak-wood caused by its being colored with the spawn of *Peziza æruginōsa*, a species of fungus.

Oak-beauty, the popular name of a British moth (*Biston prodromaria*), whose caterpillar feeds on the oak.

Oakham (ōk'kam), or OKEHAM, the county town of Rutland, England, situated in the Vale of Catmos, 85 miles N. N. W. of London. It has a fine old church, a free grammar school, and an old castle. Pop. 3668.

Oakland (ōk'land), a city of California, seat of Alameda County, on the east side of San Francisco Bay, opposite San Francisco, of which it is often considered a suburb. It is the terminus of the Ogden branch of the Southern Pacific, of the Atchison, Topeka and Santa Fé, and of the Western Pacific railways. Besides being a beautiful residential city, it has shipbuilding yards, smelting and metallurgical works, flour and planing mills, canneries, etc. Pop. (1910) 150,174; (1920) 216,261.

Oak-leaf Roller (*Tortrix viridāna*), a small moth which is very destructive to trees and takes its name from the fact that the larvæ roll themselves up in the oak leaves, which give them both food and shelter. The front wings are green, but the chief color is brown.

Oak-leather, a kind of fungous spawn found in old oaks running down the fissures, and when removed not unlike white kid leather. It is very common in America, where it is sometimes used for spreading plasters on.

Oak Park, a village of Cook County, Illinois, 8½ miles W. of Chicago, of which it is a suburb. It has no industries; essentially a residence place. Pop. (1910) 19,444; (1920) 39,830.

Oakum (ō'kum), the substance of old tarred or untarred ropes untwisted and pulled into loose fibers; used for caulking the seams of ships, stopping leaks, etc. That formed from untarred ropes is called white oakum.

Oamaru (ō-ä'ma-rŏ), a seaport of New Zealand, on the east coast of Otago, the second town of the provincial district next to Dunedin, with which it is connected by railway. It is a handsome town built of pure white limestone, has a safe and commodious harbor, and exports large quantities of cereals and other agricultural produce. It has grain-mills, a woolen factory, etc. Pop. 5071.

Oannes (o-an'nes), the Babylonian sea-god. He is described as having the head and body of a fish, to which were added a human head and feet. In the daytime he lived with men to instruct them in the arts and sciences, but at night retired to the ocean.

Oar (ōr), a long piece of timber flat at one end and round at the other, used to propel a boat, barge, or galley through the water. The flat part, which is dipped into the water, is called the *blade;* the other end is the *handle;* and the part between the two is called the *loom*. Oars are frequently used for steering, as in whale-boats. *Sweeps* are large oars used in small vessels sometimes to assist the rudder, but usually to assist the motion of the ship in a calm. A *scull* is a short oar of a length such that one man can manage two, there being one on each side, or a single oar used in propelling a boat, it being placed over the stern.

Oar-fish (*Regalĕcus Banksii*), one of the ribbon-fishes, a peculiar deep sea fish, 12 to 20 feet or more in length, but having a narrow and extremely compressed body. It is of a silvery color, and is only rarely met with, usually in a dying condition.

Oasis (ō-ā'sis), originally the name of the fertile spots in the Libyan Desert where there is a spring or well and more or less vegetation, but now applied to any fertile tract in the midst of a waste, and often used figuratively. The oases of Northern Africa are generally river valleys, the waters of which are for the most part underground, or depressions surrounded by short ranges of hills, from which small brooks descend, sometimes forming a lake in the center. In recent times oases have been formed in the Northern Sahara by sinking artesian wells. There are many important oases in the Western Sahara, in the Libyan Desert in Arabia, Persia, and

in the Desert of Gobi in Central Asia. In ancient times the most celebrated oasis was that to the west of Egypt, containing the temple of Jupiter Ammon, now called the Oasis of Siwah. See *Egypt*, *Sahara*.

Oat (ōt), or OATS (*Avēna*), a genus of edible grasses cultivated extensively in all temperate climates, and though principally grown as food for horses largely used when ground into meal as human food. There are about sixty species, the principal of which are *A. sativa* (the common oat), *A. nuda* (naked oat, pilcorn, or peelcorn), *A. orientālis* (Tartarian or Hungarian oat), *A. brevis* (short oat), *A. strigōsa* (bristle-pointed oat), *A. chinensis* (Chinese oat), etc. The cultivated species of oats are subdivided into a large number of varieties, which are distinguished from each other by color, size, form of seeds, quality of straw, period of ripening, adaptation to particular soils and climates, and other characteristics. The yield of oats varies from 20 bushels to 80 bushels per acre according to soil, etc. The weight per bushel varies from 35 to 45 lbs., and the meal product is about half the weight of the oats. Oatmeal is a cheap and valuable article of food, and its value seems to be becoming more appreciated among the wealthier classes as it is being neglected by the poorer. The wild oat (*A. fatua*) is supposed to be the original of all the species, but its native country is unknown.

Oates (ōts), TITUS, son of a ribbon weaver, born in London about 1620; died in 1705. He took orders in the Church of England, and held benefices in Kent and Sussex; became afterwards chaplain in the navy and was discharged for misconduct; turned Roman Catholic, and resided for some time at the Jesuit College of Valladolid and St. Omar, but was finally, in 1678, dismissed for repeated misdemeanors. Flung into the world as a mere adventurer, he returned to England and concocted the story of the famous 'Popish Plot' (which see). Various events gave color to the accusation, and in the public excitement created by the story several eminent Catholics were executed, while Titus Oates was lodged handsomely in Whitehall, and received a pension of £900 from parliament. The effects of this perjury continued for two years until, after the execution of Strafford, there was a revulsion of public opinion. He was afterwards convicted of perjury, sentenced to be pilloried five times a year, whipped from Aldgate to Newgate, and imprisoned for life. On the accession of William and Mary he was liberated, and lived to a good old age, enjoying an ill-deserved pension of £300 a year.

Oath (ōth), a solemn assertion or promise, with the invocation of God to be a witness of the truth of what we say. Various forms have been associated with oath-taking. Thus, men have proclaimed and symbolized their promise by chopping a fowl in two, by standing within a circle of rope, by placing the hand under another's thigh, by dipping weapons into or drinking blood, or by stretching the hands upwards towards the sky, and this latter gesture has established itself throughout Europe. Among the early Christians the question of oath-taking was a matter of much controversy, objection to it being founded upon Christ's command of 'Swear not at all' (Matt. v, 34); but this injunction was held by Athanasius and others only to prohibit colloquial as distinct from judicial swearing. This objection is still maintained, however, by Mennonites, Quakers, Anabaptists; and the Secularists in England, upon other grounds, refuse the judicial oaths. Oaths to perform illegal acts do not bind, nor do they excuse the performance of the act. In civil law, oaths are chiefly divided into two classes—assertory or affirmative oaths (*juramenta assertoria*), establishing the certainty of a present or past event, and promissory oaths (*juramenta promissoria*), which refer to a future event, a promise to execute some contract or undertaking. The laws of all civilized countries require the security of an oath for evidence given in a court of justice, and on other occasions of high importance. Any person called as a witness, or required or desiring to make an affidavit or deposition, who shall, from conscientious motives, refuse to be sworn, may obtain from the court, on its being satisfied of the sincerity of the objection, permission to make a solemn affirmation or declaration instead. See *Affirmation*, *Perjury*.

Oaxaca. See *Oajaca*.

Ob. See *Obe*.

Obadiah (ob-a-dī'a), one of the twelve minor prophets, who foretells the speedy ruin of the Edomites. The prophecy was probably uttered during the period which elapsed between the fall of Jerusalem (586 B.C.) and the conquest of Edom by Nebuchadnezzar (583 B.C.).

Oban (ō'ban), a seaport of Scotland, county of Argyle, situated on a large protected bay 92 miles from Glasgow and 493 miles from London by rail.

It is the terminus of a railway, the starting place for steamer routes, and the headquarters of tourists to the Western Highlands. Pop. 5374.

Obbliga'to. See *Obligato.*

Obdorsk (ob-dorsk'), a fishing town in Asiatic Russia, near the mouth of the Obe; the projected terminus of a railway across the northern part of the Urals to the Arctic Ocean.

O'be, O'BI, or OB, a river of Siberia, which, rising in the Altai Mountains, pursues a very circuitous course northwest to Samarova, and there dividing, flows north in a double channel to the Gulf of Obe. Its chief tributaries are the Irtish, Tobol, Tom and Tchulim. Its course is estimated at 2000 miles.

Obeah (ō-bē'a), or OBI, a species of witchcraft practiced among negroes of the West Indies. The practicer of this form of degraded superstition is called an Obeah-man or -woman, and possesses great influence.

Obeid (o-bid'), EL, an African town, the capital of Kordofan, 220 miles southwest of Khartoom. The inhabitants carry on a large trade in gum, ivory, gold, etc. It was for a time a Mahdist stronghold with a population of about 30,000. It has now hardly 7000.

Obelisk (ob'el-isk), a column of a rectangular form, diminishing towards the top, generally terminating in a low pyramid. The proportion of the thickness to the height is nearly the same in all obelisks, that is, between one-ninth and one-tenth; and the thickness at the top is never less than half, nor greater than three-fourths of the thickness at the bottom. Egypt abounded with obelisks, which were always of a single block of hard stone; and many have been removed thence to Rome and other places. They seem to have been erected to record the honors or triumphs of the monarchs. The two largest obelisks were erected by Sesostris in Heliopolis; the height of these was 180 feet. They were removed to Rome by Augustus. A fine obelisk from Luxor was erected in Paris in 1833, and the two known as Cleopatra's Needles are now in London and New York. (See *Cleopatra's Needles.*) Besides those of Egypt, monoliths of this appearance, but smaller in size, have been found in the ruined cities of Nineveh and Nimrûd. The obelisks which were common to Rome, Florence, etc., had all been removed from Egypt during its domination by the Roman emperors.

Obelus (ob'e-lus), a mark, usually of this form — —, or this ÷, in ancient MSS. or old editions of the classics, and indicating a suspected passage or reading.

Ober (ō'bėr), FREDERICK ALBION, author, was born at Beverly, Massachusetts, in 1849. He traveled extensively in Florida, the West Indies, Mexico, Spain, Africa and South America, and wrote *Camps in the Caribees, Young Folks' History of Mexico, Puerto Rico and Its Resources, The Silver City, Montĕzuma's Gold Mines,* a *Guide to the West Indies, Heroes of American History,* and many other works. He died in 1913.

Oberammergau (ō-ber-ăm'er-gou), a village in Upper Bavaria, celebrated for the performance, every ten years, of the Passion Play, the 'Christus Drama,' by the villagers. It took its rise from a vow made by the inhabitants in 1633, as an act of gratitude for the cessation of the plague. There are about 800 players, all of them natives of the village and of high moral character. It was planned to give the Passion Play in 1920, but because of the reactions of the war it was postponed to 1922. Anton Lang was again the *Christus,* for the third time.

Oberhausen (ō'bėr-hou-zn), a town of Prussia, in the Rhine province, 51 miles E. of the Rhine and 20 N. of Düsseldorf, now an important center of the iron industry, having also coal mines, chemical works, porcelain and glass works, etc. Pop. 98,677.

Oberlahnstein (ō-bėr-lăn'stīn), a town of Prussia, district of Wiesbaden, at the junction of the Lahn with the Rhine, an interesting old place with well-preserved walls, towers, etc. Pop. 8472.

Oberlin (ō'ber-lin), JOHANN FRIEDRICH, Lutheran minister, born at Strasburg in 1740; died in 1826. He became pastor of Waldbach in the Steinthal (Ban de la Roche) district of Alsace in 1767, and set about ameliorating the wretchedness of the district and the people. Despite opposition he gradually effected a wonderful improvement in the morals, industry and thrift of the community. Besides agriculture, Oberlin introduced straw plaiting, spinning and weaving into the community, so that the village of a few hundreds became a town with 5000 inhabitants, and a model to great numbers of philanthropists.

Oberlin College, an educational institution for both sexes at Oberlin, Ohio, comprising a preparatory department, a woman's department, a department of arts and philosophy, and a theological department. The attendance averages over 2000; the endowment is nearly $2,000,000.

Oberon (ō'ber-on), in popular mythology, a king of the elves or fairies, and husband of Titania. He appears first in the old French poem *Huon de Bordeaux*, but is best known from Shakespeare and from Weber's opera of *Oberon*.

Oberstein (ō'ber-stin), an old town of Western Germany in the principality of Birkenfeld, 28 miles southwest from the Rhine at Bingen, picturesquely situated on the Nahe. Cutting and polishing of agates is a specialty of the place. Pop. 9669.

Obesity. See *Corpulence.*

Obiter dictum (L.), a saying by the way, and applied specifically in law to the casual opinion of a judge in contradistinction to a *judicial dictum.*

Object (ob'jekt), in philosophy, the correlative of subject, a term used to represent the distinction between the mind, or agent, or conscious being, or whatsoever it is conceived to be that thinks (the subject), and that, whatsoever it is, that is thought of (the object). The terms subject and object were first introduced in their modern relation in scholastic philosophy, and the distinction between them was at first merely logical. *Object*, in grammar, is the word or member of a sentence or clause expressing that on which the action expressed by a transitive verb in the sentence or clause is exercised, or the word or member governed by a preposition, the word being thus put in the *objective case.*

Object-glass, in a telescope or microscope, the lens which first receives the rays of light coming directly from the object, and collects them into a focus. In the finest refracting telescopes the object-glass consists of an achromatic combination of lenses, formed of substances having different dispersive powers, and of such figures that the aberration of the one may be corrected by that of the other. The substances chiefly used are crown-glass and flint-glass.

Objective. See *Object.*

Oblati (ob-lā'ti), or OBLATES, a name given from an early period in the Roman Catholic Church to children dedicated to the church, and now applied to such persons as associate themselves like monks or nuns but without taking vows. Under the name of Oblati of St. Ambrose a congregation of secular priests was established at Milan in 1578 by St. Charles Borromeo. The Oblates of Mary Immaculate, or of the Immaculate Conception, were founded in 1815, at Aix, by the Abbé Mazenod. Their duties were to consecrate themselves to parochial missions in their dioceses; to spiritual ministrations, especially to the young, to the poor, and to prisoners. The order has houses or missionary establishments in France, England, Scotland and the United States.

Obligation (ob-li-gā'shun), is a term in law which describes the bond under which a person binds himself to pay within a certain time and in the breaking of which a penalty is involved; or the tie in general by which a person is legally bound to the performance of anything.

Obligato (ob-li-ga'tō), or OBBLIGATO (Ital. 'required') in music, a part or accompaniment in a composition for a particular instrument of such character and importance that it is indispensable to the proper performance of the piece.

Obock (ō-bok'), a port and territory belonging to France on the African coast of the Gulf of Aden, near the entrance to the Red Sea. Total pop. 22,370.

Oboe (ō'boi), a musical wind instrument resembling a clarionet in shape, and sounded through a double reed. It consists of three joints besides the mouthpiece, and its compass is generally from B below the treble clef to F in alt, with the intermediate semitones, being a compass of two octaves and one-fifth. The name oboe is from the Italian; the French form, *hautboy* (*hautbois*), was formerly more frequently used.

Oboe.

Obolus (ob'o-lus), a small coin of ancient Greece, in later times of silver, the sixth part of an Attic drachma, equal to 2½ cents; multiples and submultiples of this coin were also used, and pieces of the value of 5, 4, 3, 2, 1½

A

Brass Obolus of Metapontum. A, Actual diameter of coin.

oboli, and ½, ⅓, ¼th of an obolus respectively are to be found in collections.

Obregon (ō'bre-gōn'), ALVARO (1880-), President of Mexico, born in Sonora. At first interested in

agriculture, he later won renown as a military leader, and defeated Villa. He was Minister of War under Carranza (q. v.), but in 1920 led the revolt against that President, and was himself elected to the presidency in September, 1920.

O'Brien, WILLIAM SMITH (1803-64), an Irish Nationalist, one of the leaders of the revolt against English rule in 1848. He was exiled to Tasmania.

Obscurantism (ob-skū'ran-tizm), a word derived from Germany, where it was originally used at the time of the revival of learning, to signify opposition to progress and enlightenment. Those who opposed all innovation were called *Obscurants*.

Observation Car, a railroad car with open or glass sides, or ends, for obtaining an unobstructed view of the surrounding scenery or the track. It is used for tourists and by railroad officials on inspection trips.

Observants. See *Franciscans*.

Observatory (ob-zer'va-tur-i), a building devoted to the observation of astronomical, magnetic, meteorological, or other natural phenomena. The astronomical observatory is the one of most general interest. Astronomical observation began at an early date in China; the pyramids in Egypt seem in some way to have been associated with stellar observation; and the first historical observatory was founded in Alexandria 300 B.C. Its work was begun by Aristillus, and continued by Timocharis, Hipparchus, Aristarchus, and others. The first European observatory was built at Nuremberg by Bernhard Walther in 1472, and this was followed in the sixteenth century by Tycho Brahe's famous observatory on the island of Hven, near Copenhagen, while another was erected by the Landgrave of Hesse at Cassel in 1561. Through the labors of Brahe practical astronomy became associated with the universities, so that Leyden and Copenhagen founded observatories. These were followed by the construction of the Royal Observatory at Paris (1667), the Greenwich Royal Observatory (1675), the Tusculan Observatory near Copenhagen (1704), Berlin (1705; new observatory 1835), Vienna (1756), Dublin (1785), Königsberg (1813), Sydney (1820), Cape of Good Hope (1820), Edinburgh (1825), Pulkova, near St. Petersburg (1839), Cambridge, United States (1839), Washington (1845), Lick Observatory, California (1888), Chicago (1896), and others elsewhere. The chief instrument used in the observatory is the telescope, whether in the form of the equatorial or in the mural circle and transit instrument, together with the sidereal and the solar clock. In the larger observatories the application of spectrum analysis, photography, photometry, etc., has greatly increased the number and variety of observations. The observatory building must be constructed in a very stable manner, and as the instruments must be out of contact with the walls they are attached to stone pillars that rest on foundations separate from the rest of the building.

Obsidian (ob-sid'i-an), vitreous lava, or volcanic glass, lava which has become glassy by rapid cooling, generally placed among the felspars. Obsidian consists of silicate of alumina with iron, and lime or potash or soda according to the species of felspar involved. In Mexico and Peru cutting weapons and rings were manufactured out of it. See *Pumice* and *Pitchstone*.

Obstetrics. See *Midwifery*.

Ocarina (ok-a-rē'na), a musical wind-instrument of clay, of clumsy shape, pierced with a number of small holes, and giving a sweet tone.

Occam (ok'am), WILLIAM OF, a scholastic philosopher, born at Ockham, in Surrey, about 1270; died at Munich in 1347. He is said to have studied at Merton College, Cambridge, and also to have attended the lectures of Duns Scotus in Paris. He held several benefices in England, but entering the order of the Cordeliers, the latter and more distinguished part of his life was passed on the Continent. In 1322 he attended a general assembly of Franciscans at Pérouse, and there asserted the independence of princes in temporal affairs, and denounced the vices of the pope. For this he was condemned by the Council of Avignon, and being compelled to flee from Paris (1328) he took refuge with Louis of Bavaria. Occam is entitled *Doctor singularis et invincibilis*, and is noted as the philosopher who gave the final blow to the Realism of the middle ages, and perhaps the first effective blow to the pope's authority.

Occasional Causes, in metaphysics, a term employed by the Cartesians to explain the mode of communication between mind and matter. The soul being a thinking substance, and extension being the essence of body, no intercourse can take place between them without the intervention of the First Cause. It is Deity, therefore, who, on the occasion of certain modifications of our minds, excites the corresponding movements of body; and, on the occasion

of certain changes in our body, awakens the corresponding feelings in the mind.

Occident (ok'si-dent), the western quarter of the hemisphere, so called from the decline or setting of the sun; the west: used in contradistinction to *orient*.

Occultation (ok-ul-tā'shun), is the term used in astronomy for the hiding of a star or planet from our sight by passing behind some other of the heavenly bodies, and specifically applied to the eclipse of a star or planet by the moon. The word denotes also the time during which a star or planet is so hidden from our sight.

Occultism (ŏ-kult'ism; from Lat. *occulere*, to conceal), originally the investigation of the hidden qualities of nature. The term is now applied loosely to all forms of mysticism and esoteric philosophy; more particularly to theosophy (q. v.). It is defined by theosophists as 'the science which teaches us how to use our spiritual powers for the benefit of humanity.' But it is pointed out, on the other hand, that the occult arts teach how to use some of the secret forces of the animal or passional nature for selfish purposes. The two are sometimes described as white and black magic. The former is beneficent, the latter maleficent. The statement is made that on entering the domain of occultism the adventurer throws off all his ordinary safeguards; he renders his nature abnormally sensitive to influences against which the gross matter of the physical body normally shields him; he calls up the latent forces of his nature and wakens all the sleeping powers whose seeds lie dormant in the ordinary individual; he must therefore master these forces or be mastered by them. In her 'Key to Theosophy' Madame Blavatsky defines occultism as 'The science of the secrets of Nature—physical and psychic, mental and spiritual; called Hermetic and esoteric sciences. In the west the Kabalah may be named; in the east Mysticism, magic and Yoga-philosophy. The latter is often referred to by the chelas in India as the *seventh darshana*, or school of philosophy, there being only six *darshanas* in India known to the world of the profane. These sciences are, and have been, for ages hidden from the vulgar, for the very good reason that they would never be appreciated by the selfish educated classes who would misuse them for their own profit and thus turn the Divine Science into black magic; nor by the uneducated, who would not understand them.' Madame Blavatsky insists that 'Atma-Vidya, a term which is translated simply "Knowledge of the Soul," true wisdom by the Orientalists is the only kind of occultism that any theosophist who would be wise and unselfish ought to strive after.' See also *Theosophy*, *Spiritualism*, etc.

Occupancy (ok'ū-pan-si), in law, the taking possession of a thing not belonging to any person, and the right acquired by such taking possession.

Occupational Diseases, or INDUSTRIAL DISEASES, diseases contracted by workers in various industries. They have been classified as: I. metallic poisons; II, poisonous gases, vapors, fumes; III, poisonous chemicals, liquid and solid (acids, alkalies, dyes, petroleum products, etc.); IV, irritating or poisonous dusts, (a) metallic dust, (b) mineral dust, (c) mixed dust, (d) animal dust, (e) vegetable dust; V, infectious materials: VI, environmental condition, (a) vitiated air (odors, etc.), (b) excessive humidity, (c) excessive heat and cold, (d) defective lighting, (e) abnormal atmospheric pressure, (f) fatigue, strains, inactivity and posture, (g) dangerous machinery and miscellaneous accidents. Consult Kober and Hanson's *Diseases of Occupation*, and William Hallock Park's *Public Health and Hygiene*.

Occupational Therapy, the theory and practice of avocations for invalids, dealing primarily with curative work as an adjunct to medicine and surgery. Both as a department of investigation and as an organized movement, its main objective is the prevention of hospitalization or the attitude of invalidism—the mental and moral deterioration that often accompanies convalescence or prolonged disability.

The avocations generally prescribed fall into two main classes: First, bedside occupations, such as weaving belts, stringing necklaces, making working drawings and designs, carried on with the help and encouragement of trained occupational aides. Second, hospital workshop occupations, such as molding pottery, stamping leather, caning chairs, weaving rugs, making toys and boxes with jig-saw and paints, art needlework, typewriting. Such work is often done out of doors on porches and in pavilions, or again in the homes of out-patients and shut-ins.

In sanatoria, homes for convalescents, and certain hospitals, the Occupational Therapy Department sometimes deals with problems of kinesiology or curative exercise, occupational recreation, pre-vocational training, and therapeutic and economic values of participation in institu-

tional upkeep and management—for example, the making and upkeep of the linen and certain furnishings, the preparation of surgical dressings, office work, gardening, and assistance or leadership in recreational activities.

The main tendency in Occupational Therapy is, however, toward the appeals (a) to the creative impulse, or instinct of workmanship, through the arts and crafts, and (b) to the desire to be self-supporting, or economic sense, through giving patients the profits on the sale of their products and through merging therapeutic occupation with vocational training as rapidly as possible. Herein lie many problems for careful investigation and discussion. 'Cured and fitted for work,' is the goal toward which all Occupational Therapy looks.

Three closely related aspects of the work are now apparent: the physiological, the psychological, and the sociological. First, the bodily or physiological aspect. Often disabled organs, muscles, joints, and nerves, thought by the patient to be hopelessly incapacitated, are *indirectly* brought into wholesome use and their functioning thus restored. The transfer of attention from the disabled organ and from the fear of using it, aids nature's restorative processes. With mental or nervous patients this transfer of attention is often from the body as a whole or from some organ supposed to be weak.

Second, the psychological aspect. There is usually a critical point in convalescence or prolonged disability, 'a plateau of despond,' when discouragement may start a physical and moral slump. This may spoil all chances for final recovery or nullify any later reconstructive efforts. Occupational Therapy is designed to forestall such an attitude of hopeless introversion, or so-called introspection, by developing 'habits of positive, if mild and feeble, interest and progress.' Gradually feelings of self-confidence, of enjoyment of activity, and of a new or renewed interest in life are restored.

The sociological aspect. The necessity for adequate and prompt economic reinstatement of the disabled has been recognized as a matter of social economy since the World War. Before that, industrial accident companies and others interested in workingmen's compensations, emphasized this principle. Occupational Therapy has often proved to be an 'indispensable link in the chain of rehabilitation, filling the gap' between total disability and vocational training or actual employment.

The therapeutic value of occupations was first recognized in hospitals for mental and nervous diseases, where they were introduced early in the nineteenth century. Today every modern hospital or sanitarium for these diseases has a well-equipped Department of Occupational Therapy. In recent years Occupational Therapy has been conducted in connection with out-patient mental clinics. The first work of this kind was organized at the Phipps Psychiatric Clinic in Baltimore.

Tuberculosis sanatoria were the next to realize the values of Occupational Therapy. Patients who are lacking in the rudiments of education that will enable them to take up light work after discharge, practice mechanical drawing, estimating and other elements of industry and commerce, along with the constructive avocations. Some of these convalescents, who have not been accustomed to do much mental work, thus acquire concentration and application of mind in preparation for future usefulness.

During the World War occupational or reconstruction aides were in great demand in France, England, Canada, and America, to assist in rebuilding the morale and efficiency of shell-shocked and other military patients, especially war cripples and gas victims. There is in the United States a national society of military occupational aides with a monthly journal of its own. In the French reconstruction hospitals, psychiatrists, *i. e.*, medical psychologists, were appointed to coöperate with occupational therapists in studying patients of all types to help in determining their avocational and vocational aptitudes. Similar work was carried on in the Walter Reed Hospital in Washington by educational psychologists.

Occupational Therapy is now enthusiastically supported in the American Army and in the Public Health Hospitals. It is gradually being introduced into general hospitals and children's hospitals. Its introduction into the field of hospital social service and district nursing is its most recent extension.

Some of its scientific bases and practical methods are closely related to (1) institutional and special class work arranged for the permanently handicapped, mentally or physically, such as is carried on in training schools and public school classes for the feeble-minded, for cripples, for the blind, etc., and to (2) certain movements in the modern education of normal children; *e. g.*, the introduction of the simpler industries and manual arts into the curriculum, the development of the project method, etc.

The National Society for the Promotion of Occupational Therapy, made up of occupational directors and aides, physicians, educators, and others broadly interested in the subject, is thriving and is stimulating

the organization of local and state societies and committees. Affiliated with the national society are the Medical Workshop or experimental laboratory conducted by Dr. Herbert J. Hall at Marblehead, Massachusetts, and the Occupational Therapy Bureau in Boston. The latter is both a purchasing bureau for supplies and a selling agency to assist departments of occupational therapy in marketing their finished products.

Columbia University offers courses, with scholarships, for the training of occupational aides and directors, and there are well-organized Schools of Occupational Therapy in Chicago, Boston, Philadelphia, St. Louis, Milwaukee, Detroit, and New York. The Chicago school, originally conducted by the Illinois Society for Mental Hygiene, is now conducted by the state. (See *Mental Hygiene.*)

Ocean (ō'shan), or SEA, the vast body of water which covers more than three-fifths of the surface of the globe. Although no portion of it is completely detached from the rest, the ocean has often been divided into several great basins or areas, viz., the Pacific Ocean, which separates Asia and Australia from America; the Atlantic Ocean, which separates America from Europe and Africa; and the Indian Ocean, which intervenes between Africa and Australia; together with the Arctic and the Antarctic Oceans, around the north and south poles respectively. Between these no very definite limits can be drawn; thus it is impossible to say where the Atlantic or the Pacific ends and the Antarctic or Southern Ocean begins. The bed of the ocean appears to present the same irregularities as the surface of the land, being diversified by rocks, mountains, plains and deep valleys. The deepest soundings at present known are 4655 fathoms (northeast of Japan), 4561 fathoms (north of Porto Rico), 4475 fathoms (south of the Ladrone Islands). (See *Atlantic Ocean, Pacific Ocean,* etc.). The waters of the ocean vary as greatly in temperature as they do in depth. This is partly due to the ordinary effects of isolation; but the abrupt changes and anomalous distribution of temperature is chiefly owing to currents. (See *Currents, Marine.*) The Pacific and Indian Oceans are both warmer in low latitudes than the Atlantic, and the mean temperature of the equatorial areas at the surface is assumed to be 81°.5; the warmth of the North Atlantic is anomalous, and due to the influence of the Gulf Stream. This high temperature only applies to the surface water of the ocean, for experience shows that in both hemispheres and in all latitudes the basic water of the ocean is exceedingly cold. In low latitudes water at 32° has been drawn from great depths; while in high latitudes water at 26° has been found. This phenomenon is accounted for by the supposition that the cold water at the poles, by reason of its specific gravity, sinks to the bottom and spreads throughout the ocean basin. The saltness of the ocean is due to the presence of various saline ingredients (chiefly chloride of sodium or common salt), which are generally found in the proportion of from 30 to 40 per thousand. Recent observations have shown that the color and transparency of the water of the ocean are in a large measure dependent on the degree of saltness. In general it is found that the greater the transparency, and also that where the saltness is very great the water is of a dark-blue color, that where it is less the water is of lighter blue, inclining to green, and that in the neighborhood of rivers (where the saltness is reduced to a minimum) the water is as a general rule of a greenish-yellow.

Oceania (ō'she-an-i-a), includes all the islands of the Pacific between Asia on the northwest, the Indian Ocean on the west, the Antarctic Ocean on the south, and America on the north and east. It is usually divided into Australasia, Polynesia and Malaysia, or the Malay Archipelago.

Oceanus (ō-sē'an-us), in Greek and Roman mythology, the eldest of the Titans, regarded as the god of the ocean or the river surrounding the earth, and the parent of the Oceanides or ocean nymphs.

Ocellus (ō-sel'us), one of the minute simple eyes of insects, many echinoderms, spiders, crustaceans, molluscs, etc. In insects these ocelli or stemmata are usually situated on the crown of the head between the great compound eyes, whose simple elements they resemble in structure, and in rare cases may be the sole organs of vision.

Ocelot (ō'se-lot; *Felis pardālis*), a digitigrade carnivorous mammal of the cat kind, peculiar to the American continent. It attains a length of about 3 feet, while the tail measures some 18 inches more. The ocelot inhabits great forests; its food consists mainly of birds and rodents; and it is timid but bloodthirsty.

Ochil Hills (ō'kil), a hill range of Scotland, on the borders of Perth, Clackmannan, Kinross and Fifeshire; length about 25 miles; average breadth about 12; highest summit, Bencleuch, 2363 feet.

Ochre (ō'kẽr), a combination of peroxide of iron with water; but the name is generally applied to clays colored with the oxides of iron in various proportions. Considerable quantities of ochre are obtained from the ferruginous mud separated from tin and copper ores; and it is also found in natural beds some feet thick in the more recent formations. Ochres vary in color from a pale sandy yellow to a brownish red, and are much used in painting.

Ocelot (*Felis pardalis*).

Ochrida (ok'ri-da), a town of European Turkey, in the mountainous region of Albania, on the shore of the lake of Ochrida, 2260 feet above sea level. It is the seat of Bulgarian and Greek bishops. Pop. 12,000.

Ockley (ok'li), SIMON, born at Exeter in 1678; died in 1720. He became professor of Arabic at Cambridge in 1711, and published a *History of the Jews*, several translations from Oriental languages, and a well-known *History of the Saracens*.

Oclawaha (ok-la-wa'ha; 'crooked water'), a river of Florida, which, after a very winding course of 275 miles, flows into the St. John's about 25 miles south of Palatka. Its banks are densely wooded, and the country so flat that the waters extend into the forest for a distance on either side. Many tourists visit it, and one of them relates that he steamed on this narrow river for five consecutive hours, and all that time was out of sight of land. He could see only trees and water.

Ocmulgee River (ok-mul'gē), a river which rises in the central part of Georgia, runs in a S. S. E. direction, passing the town of Macon and ultimately unites with the Oconee to form the Altamaha river. Length about 200 miles.

O'Connell (ō-kon'el), CARDINAL WILLIAM HENRY, an American Roman Catholic prelate, born in 1859 at Lowell, Mass. He became Archbishop of Boston, 1907; created cardinal, 1911.

O'Connell (ō-kon'el), DANIEL, an Irish patriot (1775-1847), born in Kerry and educated at a school in Cork and the Catholic colleges of St. Omer and Douay. He studied for the Irish bar, and soon became distinguished for legal skill and oratory. Turning his energy to Irish politics he advocated Catholic Emancipation; skilfully kept the agitation within constitutional lines; became member for Clare in 1828; and attained his triumph in the following year when the government of the Duke of Wellington granted the Catholic claims. After the Reform Bill he became conspicuous as the head of a parliamentary body called 'O'Connell's Tail.' In 1841 he developed his policy, called together enormous meetings throughout Ireland, and loudly raised a cry for the Repeal of the Union. This agitation Sir R. Peel and the government determined to put down. They arrested O'Connell, obtained a conviction, and sentenced him to twelve months' imprisonment with a fine of £2000. In a few months the House of Lords quashed this judgment. He made his last speech in parliament April, 1847, and died the following month.

O'Connor (ō-kon'or), THOMAS POWER, statesman, born at Athlone, Ireland, in 1848. He became a journalist, and in 1880 entered parliament as member for Galway, and was prominent in the Parnell party. In 1883 he became president of the Irish National League of Great Britain. He was an editor on several London papers, wrote *The Parnell Movement* and many magazine articles, and visited the United States on several occasions to raise money for the Irish cause.

O'Conor, CHARLES, lawyer, born in New York in 1804; died in 1884. He became one of the ablest of New York lawyers and was counsel in several celebrated cases. Thus he was senior counsel for Jefferson Davis when the Confederate ex-President was indicted for treason, and was conspicuous in the suits against William M. Tweed in 1871. He was elected president of the Law Institute of New York in 1869, was nominated for President of the United States by one of the many conventions of 1872, and in 1876 appeared before the Electoral Commission in support of the claim of Samuel J. Tilden against Rutherford B. Hayes to the Presidency.

Oconto (ō-kon'tō), a city, capital of Oconto Co., Wisconsin, one of the largest lumber manufacturing points in the State, is on Green Bay, at the mouth of Oconto River. It has an im-

portant fish trade; also flour, saw and knitting mills. Pop. (1920) 4920.

Ocracoke Inlet (ō'kra-kōk), an inlet of North Carolina, forming a passage into Pamlico Sound, 22 miles southwest of Cape Hatteras. On each side of the channel are dangerous shoals; on the bar are 14 feet at low water.

Ocrea (ō'kre-à), in ancient costume, a greave or legging, made of tin, bronze, or other metal, covering and protecting the front of the leg from the knee to the ankle.

Octagon (ok'ta-gon), in geometry, is a figure of eight sides and angles, which when the sides and angles are all equal is called a *regular octagon*, and when they are not equal an *irregular octagon*.

Octahedron (ok-ta-hē'dron), in geometry, a solid contained by eight equal and equilateral triangles. It is one of the five regular bodies.

Octant (ok'tant), in astronomy, that position or aspect of a heavenly body, as the moon or a planet, when halfway between conjunction or opposition and quadrature, or distant from another point or body the eighth part of a circle or 45°. The word is also applied to an instrument for measuring angles, resembling a sextant or quadrant in principle, but having an arc the eighth part of a circle, or 45°.

Octave (ok'tāv), in music, an interval of seven degrees or twelve semitones above or below some sound counted from; or one sound eight tones higher than another. The octave is the most perfect of the chords, consisting of six full tones and two semitones major. It contains the whole diatonic scale. The most simple perception that we can have of two sounds is that of unisons, or sounds of the same pitch, the vibrations beginning and ending together. The next to this is the octave, where the more acute sound makes precisely two vibrations while the grave or deeper makes one; consequently, the vibrations of the two meet at every single vibration of the more grave one. Hence the ratio of the two sounds that form the octave is as 1 to 2. See *Music*.

Octavia (ok-tā'vi-a), daughter of Caius Octavius and Atia, and sister to the Emperor Augustus, illustrious for her virtues, her beauty, and her accomplishments, was the widow of Claudius Marcellus, by whom she had a son and two daughters before she was married, at the instance of her brother, to the triumvir Mark Antony. The latter neglected her for Cleopatra, queen of Egypt; notwithstanding which, Octavia displayed the most noble fidelity to his house and fortunes, and devoted herself to the education of all his children, until he divorced and ordered her to leave his house, a command she obeyed without complaint. She died in 11 B.C.

Octavius, or OCTAVIANUS. See *Augustus*.

Octavo (ok-tā'vō), the size of one leaf of a sheet of paper folded so as to make eight leaves: usually written *8vo*; hence, a book having eight leaves to the sheet. There are different sizes of octavo, arising from the different sizes of paper employed; as, *foolscap 8vo, demy 8vo, imperial 8vo*.

October (ok-tō'bèr; from the Latin *octo*, eight), originally the eighth month in the Roman calendar, whence its name, which it still retained after the beginning of the year had been changed from March to January.

Octopus (ok'tu-pus), a genus of dibranchiate Cephalopoda, familiarly known as cuttle-fishes. They have eight arms, each with two rows of suckers, which are sessile or unstalked. The prominent head is joined to the body by a distinct neck, and the body itself is short, generally more or less rounded in shape, and unprovided with side or lateral fins. They have attained a notoriety from tales circulated concerning their ferocity and the existence of gigantic members of the genus, though the largest

The Common Octopus or Cuttle (*O. vulgaris*).

cuttle-fishes that have been met with have belonged to other genera. The *O. vulgaris*, or common cuttle, is common in the Mediterranean. It is said to reach a length of 9 feet and a weight of 68 pounds, the arms being long and slender.

Octroi (ok-trwâ), an old French term signifying a grant, privilege, or monopoly from government to a person or to a company. Octroi also signifies a tax levied at the gates of French cities,

towns, etc., on produce brought in for use.

Ocuba-wax (o-kū'ba), a vegetable wax obtained from the fruit of *Myristica ocŭba, officinālis,* or *sebifĕra,* a plant of the nutmeg genus growing abundantly in the marshy grounds on the shores of the Amazon and its tributaries. It is easily bleached, and is used extensively in Brazil for the manufacture of candles.

Oczacow (och-â-kof'), or OTCHAKOF, a town in the Russian government of Kherson, on the Black Sea, at the mouth of the Dnieper, formerly an important Turkish fortress. Pop. 10,784.

Od, or ODIC FORCE, the name invented by Reichenbach and given by him to a peculiar force which he fancied he had discovered associated with magnetism. It has met with few scientific believers. Called also *Odyl, Odylic Force.*

Odalisk, ODALISQUE (ō'da-lisk; from Turk, *odalĭk,* a chamber companion), a female slave or concubine in the sultan's seraglio or a Turkish harem.

Odal Right (ō'dal), a free tenure of property, similar to allodial tenure, which prevailed in Northern Europe before the introduction of the feudal system. Odal or udal tenure still prevails in Orkney and Shetland.

Odd Fellows (od'fel-lōz), a large and extensively ramified friendly society, having its origin in Manchester, England. It was originally an association of a convivial kind, modeled on freemasonry, and still retains watchwords and secret signs. It assumed its present form at a convention in Manchester (1813), and has spread widely in Britain and elsewhere. It has been very prosperous in the United States, the first lodge, organized in Baltimore, April 26, 1819, becoming in 1825 the Grand Lodge of the United States. The membership in this country is now over 1,400,000. The American system has become popular in France, Germany, Switzerland, Holland, Sweden, Denmark, and various other countries. The amount paid for relief of members, burial of the dead, etc., annually is now over $5,000,000. See *Friendly Societies.*

Ode (ōd), a poem of lyrical character, supposed to express the poet's feelings in the pressure of high excitement, and taking an irregular form from the emotional fervency which seeks spontaneous rhythm for its varied utterance. The Greeks called every lyrical poem adapted to singing—and hence opposed to the elegiac poem—an ode (*ōdē,* that is, *song*). The principal ancient writers who employed this form of verse were Pindar, Anacreon, Sappho, Alcæus, among the Greeks, and Horace among the Romans. As employed by English writers the ode takes either the Pindaric form of strophe, antistrophe, and epode irregularly arranged and contrasted; or, as in its later development, the form of a series of regular stanzas.

Odenkirchen (ō'den-kir-ĥen), a town of Prussia, province of Rheinland, 15 miles W. S. W. of Düsseldorf. Pop. 16,808.

Odense (ō'then-sā), a seaport town of Denmark, capital of the Island of Funen, on a stream, and near the fiord of same name. It is well built; has an ancient and magnificent cathedral. Pop. (1911) 43,237.

Odenwald (ō'den-vâlt), a forest and chain of mountains in Western Germany, between the Neckar and the Main, in the territories of Hesse, Baden and Bavaria. The Odenwald is about 50 miles in length, and presents charming scenery.

Odeon (ō-dē'on; Gr. *ōdeion,* from *ōdē,* a song), a kind of theater in ancient Greece in which poets and musicians submitted their works to the approval of the public, and contended for prizes. The name is now sometimes applied to a hall or chamber for musical or dramatic performances.

Oder (ō'dĕr), a river of Germany, which rises in the Moravian table-land, 14 miles east of Olmütz; flows for about 50 miles through Moravia; forms the frontier between Prussian and Austrian Silesia; becomes navigable at Ratibor; traverses the provinces of Silesia, Brandenburg and Pomerania; widens into a maritime lake called the Stettin Haff; and enters the Baltic by the three channels of the Peene, the Swine, and the Dievenow; length about 550 miles. The traffic on this river is important, and the principal towns on its banks are Breslau, Glogau, Frankfort, Küstrin and Stettin.

Odessa (ō-des'sa), a Russian seaport in the government of Kherson, situated on the Black Sea, between the mouth of the Dnieper and Dniester, on the bay of Odessa. After the cession of Bessarabia by the Peace of Jassy in 1792, Catharine II fixed on this spot, then containing only a few houses, as a commercial emporium. The roadstead is large and deep, but dangerously exposed to easterly winds. The shipping, however, is protected in three large harbors inclosed by moles, and the city is fortified in the modern style. Odessa is situated on the edge of a sterile plateau which

here sinks abruptly to the sea. The streets are straight, wide, and cross each other at right angles; there are some fine promenades, two public gardens, and numerous public buildings. The educational institutions include a university founded in 1865. Odessa is one of the chief wheat ports in the East, while wool, timber, hemp, flax, iron, coal, etc., are among the staple exports. Besides the maritime trade, Odessa carries on a large overland trade by rail with Germany, Austria, France, Switzerland and Italy. Odessa was partially bombarded in 1854 during the Crimean war, and was devastated by riots in 1905. Pop. (1910) 620,200.

Odin (ō'din), or WODEN, the chief god of the Scandinavian mythology, the omniscient ruler of heaven and earth, having his seat in Valaskjalf, where he receives through his two ravens tidings of all that takes place in the world. As war-god he holds his court in Valhalla, where all brave warriors arrive after death and enjoy the tumultuous pleasures they delighted in while on earth. His wife is Frigga. The fourth day of the week, Wednesday, derived its name from this deity. See *Northern Mythology*.

Odoacer (ō-dō-ā'sėr), the first barbarian king or ruler of Italy after the fall of the Western Empire, A.D. 476 to 493. He was of German origin, the son of Edico or Idico, hereditary head of the Scyrri tribe, and received his early training in the camp of Attila, king of the Huns. He afterwards journeyed into Italy, and joined the imperial guard of the Roman army. He was chosen head of the barbarian confederates, and having overthrown Romulus Augustulus, the last of the Roman emperors, he assumed the title of king in 476. Out of policy he paid court to the Byzantine emperor Zeno, from whom he received the title of *Patricius* or Patrician. He ruled with vigor and wisdom. In 489 Italy was invaded by the Ostrogoths under Theodoric, and in repeated battles Odoacer was defeated, being finally besieged in Ravenna, on the fall of which city he was assassinated.

Odometer (o-dom'e-tėr). Same as *Hodometer* (which see).

O'Donnell (ō-don'el), LEOPOLD, Duke of Tetuan, Marshal of Spain, born in 1809; died in 1867. He was descended from an Irish family long settled in Spain; entered the army and became a colonel; fought against the Carlists in 1833; drove Espartero from power in 1843; was minister of war in 1854, and prime minister in 1856 and 1858. He commanded with success in the campaign against the Moors 1859-60, being then created Duke of Tetuan. He was at the head of ministries in 1863 and 1865-66.

O'Donovan (ō-don'o-van), JOHN, Irish Celtic scholar, born in 1809; died in 1861; published (with Prof. O'Curry) the *Brehon Laws*, *Annals of the Four Masters*, etc.—His son, EDMOND O'DONOVAN (born 1838), war-correspondent and traveler, published the *Merv Oasis*, and was killed in the Soudan in 1883.

Odontoglossum (o-dont-o-glos'um), an extensive genus of orchids, natives of Central America, much prized by cultivators for their magnificent flowers, which are remarkable both for their size and the beauty of their colors. A considerable number of species

Odontoglossum Alexandræ.

have been introduced into Europe, and grow well in a moderate temperature. *O. crispum* or *O. Alexandræ* is a superb flower, and is named after the Princess of Wales.

Odontophore (o-don'to-fōr), the so-called 'tongue' or masticatory apparatus found in the mouth of the three classes of higher mollucs—the Gasteropods, Pteropods and Cephalopods—which are thus collectively known as the Odontophora. This structure consists of a gristly portion, which supports a ribbon or strap-like band provided with flinty or siliceous teeth variously disposed in a transverse manner.

Odonthornithes (o-dont-or'nith-ēz). a name for certain fossil birds characterized by having teeth, as the hesperornis and ichthyornis (see those articles).

Odysseus (o-dis'ūs). See *Ulysses*.

Odyssey (od'is-si), an epic poem attributed to Homer, in which the adventures of Odysseus (Ulysses) are celebrated. See *Homer*.

Œcolampadius (e k.-ol-am-pā'di-us), JOHANN, an early Protestant writer, born of a Swiss family at Weinsberg, in Suabia, in 1482; died in 1531. His proper name was Heussgen or Hussgen, which, according to the custom of the time, he converted into Œcolampadius. He studied law at Heidelberg and Bologna; became tutor to the sons of the elector-palatine; afterwards prepared himself for the ministry and accepted a call as preacher to Basel. When Luther spread his doctrine of reform it was accepted by this Swiss preacher, who fearlessly proclaimed his new faith (1522) from his pulpit at Basel. Subsequently, however, he took the view of Zwingle regarding the Lord's Supper, and on this point disputed with Luther and Calvin. Among the works which he wrote in defense and furtherance of the Reformation are *De Ritu Paschali*, and *Epistola Canonicorum Indoctorum ad Eccium*.

Œcumenical (ē-kū-men'i-kal; Greek, *oikoumenikos*, pertaining to the whole inhabited world), universal, an epithet applied to the general councils of the church. From the time of the Council of Chalcedon (451) the patriarchs of Constantinople took the title of œcumenical, in the same sense as the epithet Catholic is used in the Western Church. See *Council*.

Œdema (ē-dē'ma), a swelling occasioned by the presence of water which collects in the interstices of the cellular tissues. The subcutaneous cellular tissue is the most frequent, but not the only, seat of œdema. The other forms which are most frequently recognized during the life of the patient are œdema of the lungs and of the glottis. Œdema of the brain is of less frequent occurrence and less easily recognized, and œdema of the submucous and subcellular tissue seldom produces symptoms sufficiently decisive to determine their nature. When the disease is associated with erysipelas, deep-seated suppuration, or a morbid state of the circulation, it is attended with great danger.

Oedenburg (*eu*'dėn-burh), a town of Western Hungary, capital of the county of the same name, on a plain near Lake Neusiedl, 36 miles S. S. E. of Vienna. It is well built, and has manufactures of woolen, linen, cotton cloth, sugar-refining, etc. Pop. 33,478.

Œdipus (ed'e-pus), in ancient Greek legend, son of King Laius of Thebes, was exposed as an infant—on account of an oracle saying that Laius would be killed by his son—and was brought up at the court of Corinth. Having solved the riddle of the Sphinx he became king of Thebes, unknowingly killed his own father and married his mother Jocasta—a fate foretold by the Delphic oracle. On realizing what had been done Jocasta hanged herself, and Œdipus put out his own eyes. This story has been used by the poets to symbolize the helplessness of man before Fate. The *Œdipus* of Æschylus and Euripides are lost, but the *King Œdipus* and *Œdipus at Colonos* of Sophocles remain. The story has also been made the subject of tragedies by Corneille, Voltaire, Chénier, Dryden and Lee.

Oehlenschläger (*e u*-lėn-shlā'gėr), ADAM GOTTLOB, born in a suburb of Copenhagen in 1779; died in 1850. His education was desultory; he tried the stage under the training of Rosing; entered the University of Copenhagen in 1800, and published his first volume of poems in 1803; was soon recognized as the chief Danish poet; received a government grant which enabled him to visit Germany, France, Switzerland and Italy (where he met Goethe, Fichte, Madame de Stäel), and thereby deepened his interest in the new Romantic movement spreading through Europe. His finest works, such as *Baldur hin Gode*, *Palnatoke*, *Axel og Valborg*, and the tragedy of *Hakon Jarl*, were written at this period. Returning to Denmark in 1810, after an absence of five years, he was appointed professor of æsthetics in the University of Copenhagen. In the controversy which his writings occasioned Oehlenschläger took no personal part, but continued to write almost to the end, his chief works, besides those above-mentioned, being: *Helge*, *Hroars Saga*, *Nordens Guder*, *Erik og Abel*, *Dronning Margrethe* and *Dina*.

Oeil-de-bœuf (ē'il-de-buf; Fr., 'ox-eye'), applied in architecture to the round or oval openings in the frieze or roof of a large building to admit light.

Oeland (*eu*'lánt), a Swedish island in the Baltic, on the east coast of Sweden opposite Kalmar, and separated from the mainland by a sound which has an average breadth of 10 miles. In length it is 85 miles, its breadth averages about 4 miles, and the population is 30,408.

Oels (eulz), a town of Prussia, in the province of Silesia, 17 miles northeast of Breslau, on the Oelsa. It has manufactures of agricultural implements,

lumber, wagons, shoes, and other products. Pop. 11,717.

Oelsnitz (ulz'nits), a town of Saxony. Has manufactures of carpets, etc. Pop. 14,000.

Oelwein (ōl'wīn), a city of Fayette Co., Iowa, 50 miles N. of Cedar Rapids. The machine shops of the Chicago Great Western R. R. are here. Pop. (1920) 7455.

Oerebro. See *Orebro.*

Oersted. See *Orsted, Hans Christian.*

Oesel (ā'zl), an island of Russia, government of Livonia, in the mouth of Riga; length about 80, greatest breadth about 40 miles. Its coast is generally bold and its interior undulating, and the climate is much milder than on the adjoining mainland. It raises corn, hemp, flax, and the fisheries are valuable. Pop. 60,000.

Œsophagus (ē-sof'a-gus), or GULLET, the membranous and muscular tube which leads from the pharynx or back part of the mouth to the stomach. In man the length of the gullet is from 9 to 10 inches. It begins at the fifth cervical or neck vertebra, at a point corresponding with the cricoid cartilage of the larynx, and it runs in a slightly deviating course downwards to the stomach. Thus in the neck it lies close behind the windpipe; while in the chest it bends to the right side and then to the left before it pierces the midriff or diaphragm—which forms the floor of the chest—by a special aperture existing in that structure. Internally the gullet is lined by mucous membrane, and between the mucous and muscular layers cellular tissue exists. The mucous or lining membrane is thick and of pale color, and is arranged in longitudinal furrows or folds. In the lower animals the modifications of the œsophagus are various. In birds, for instance, it presents the expansion known as the *crop.*

Œstrus. See *Gadfly.*

Œta (ē'tȧ), a mountain in ancient Greece, forming the south boundary of Thessaly, and separating that country from Central Greece. At the east extremity was the Pass of Thermopylæ. See *Thermopylæ.*

Ofen. See *Budapest.*

Offa, a distinguished king of Mercia, who attained the throne after Ethelbald, on defeating the usurper Beornred, (A.D. 757). He brought Kent under his sway, and reduced the power of Wessex by a defeat inflicted in 777. He also defeated the Welsh, took from them part of their border lands, and to keep them within their new limits erected here the rampart known as Offa's Dyke (which see). Later he murdered Ethelbert, king of East Anglia, and seized his kingdom. He founded the Abbey of St. Albans, and was a liberal patron to the church. He died in 796.

Offa's Dyke, a rampart, the remains of which may still be seen extending along the English and Welsh border from the vicinity of Newmarket, in Flintshire, to Beachley, at the mouth of the Wye; length about 100 miles. Its erection is ascribed to King Offa of Mercia. See above.

Offenbach (of'en-bȧh), a town of Germany, Grand-duchy of Hesse, 5 miles E. S. E. of Frankfort (with which it is connected by an electric railway), on the left bank of the Main. It is well built, has an old castle, and is an important commercial and manufacturing center, its industries embracing various chemical products, as aniline, white-lead, vaseline, celluloid, etc.; metal goods, leather goods, paper, etc. Pop. 75,583.

Offenbach, JACQUES, a French composer, born of Jewish parents at Cologne in 1819; died in 1880. He entered the Paris Conservatoire in 1835; became proficient on the violoncello, and for some time played on this instrument in the orchestra of the Théâtre Comique. In 1847 he became conductor at the Théâtre Français, and subsequently opened the 'Bouffes Parisiens,' where he enjoyed immense popularity as the composer of such operas as *Orphée aux Enfers, La Grande Duchesse, La Belle Hélène, Madame Favart, La Barbe Bleue, Geneviève de Brabant* and *La Princesse de Trebizonde.*

Offenburg (of'en-burg), a town of Baden, on a hill near the right bank of the Kinzig, 42 miles south of Carlsruhe. It is well built, has a fine town house, merchant-hall, gymnasium, and thriving manufactures. Pop. 15,434.

Offerings. See *Sacrifices.*

Offertory (of'ẽr-tur-i), that portion of the service of the Eucharist in which the offerings of the congregation are made, whether these consist of bread and wine or alms. The term is used in the Roman Catholic Church to denote that portion of the mass which is being sung when the priest offers the bread and wine; while in the Church of England it is applied to the sentences read from the service when the alms are being collected, or is applied to the alms themselves.

Office (of'is), DIVINE, in the Roman Catholic Church, the entire com-

plement of services which constitute the established order of celebration of public worship. See *Breviary*, *Missal* and *Liturgy*.

Officinal (o-fis'i-nal); (Latin, *officina*, a workshop), in pharmacy, the name applied to the recipes admitted into the pharmacopœia, and in particular to plants used in the preparation of recognized medical recipes.

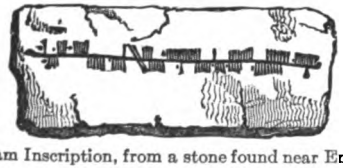
Og, king of Bashan at the time of the conquest of Canaan by the Israelites, by whom he and his people were destroyed.

Ogden (og'den), a city, county seat of Weber Co., Utah, 37 miles N. of Salt Lake City, at junction of the Ogden and Weber rivers, on the Oregon Short Line, Southen Pacific, Denver & Rio Grande and other railroads. It has hydroelectric power, machine shops, iron works, and is the chief food-manufacturing center of the intermountain country, headquarters for milling, grain, canning, and sugar production, meat packing and stock handling. Has many educational and charitable institutions. The canyons in the neighborhood are noted for their beauty. Brigham Young planned the city in 1850. Pop. (1910) 25,580; (1920) 32,804.

Ogdensburg (og'denz-burg), a city and river port of New York, on the right bank of the St. Lawrence, at the mouth of the Oswegatchie, 72 miles below Lake Ontario, at the head of deep water navigation. It is a place of very extensive trade and has manufactures of flour, lumber, silks, brass goods, leather, pipes, etc. Pop. (1920) 14,609.

Ogee (ō'jē), in architecture, a molding consisting of two members, the one concave, the other convex, or of a round and a hollow; otherwise called a *cyma reversa*. (See *Cyma*.) An *ogee arch* is an arch with a similar curve. Ogee is frequently expressed by the two capitals OG.

Ogham (og'am), a particular kind of writing practiced by the ancient Irish and some other Celtic nations.



Ogham Inscription, from a stone found near Ennis.

Its characters (also called *oghams*) consist principally of lines or groups of lines deriving their significance from their position on a horizontal or chief line, under, over, or through which they are drawn, either perpendicular or oblique; curves rarely occur. Authorities differ as to the total number of letters represented in the alphabet, some making sixteen, others twenty-five. Regarding the age of this form of writing it is now supposed that it was used not only in prehistoric times, but also so late as the ninth and tenth centuries. Stones with ogham inscriptions are found in Leinster and Connaught, also in some parts of Wales.

Oglethorpe (ō'gel-thorp), JAMES EDWARD, colonizer, was born at London in 1689; died in 1785. He served as a soldier under Marlborough and Prince Eugene in Germany, and in 1733 formed a colony of insolvent debtors in Georgia. He remained for ten years in Georgia, fought the Spanish invaders, and after his return entered Parliament.

Oglio (ol'yō), a river of N. Italy, which rises in the Alps, drains Lake Iseo, and falls into the Po; length, 150 miles.

Ogoway (ō'gō-wā), OGOWAI, or OGOWE, a river of Africa which enters the Atlantic at Cape Lopez through a large delta on the west coast, about 400 miles north of the Congo. Its course is chiefly in the French Congo Territory, and its chief affluents are the Ivindo and the Ngunie. A number of French stations have been established on its banks.

Ogyges (o-gī'jēz), in Greek mythology, the most ancient ruler of Attica, in whose reign happened a great deluge which destroyed the cities on Lake Copaïs. Ogyges was originally the name of a sea god.

O'Higgins, AMBROSIO, a South American administrator, was born in County Meath, Ireland, about 1730. He was educated in Spain and afterwards became a trader in Chile. Here he entered the army, rose rapidly in rank, and was captain-general of Chile, 1788–96, and then viceroy of Peru till his death in 1801.

O'Higgins, BERNARDO, son of the preceding, was born at Chillan, Chile, in 1778, was educated in England, and in 1810 took a prominent part in the Chilean insurrection. He was made commander of the patriot army in 1813, was defeated by the Spanish forces in 1814, joined San Martin in his invasion of Chile and aided in the victory of Chacabuco, 1817. He was then made supreme dictator of Chile, and in 1818 proclaimed independence, which was decided by the victory of Maipo, April 5, 1818. His rule was an excellent one, but he was forced to resign by a revolution in 1823, and retired to Peru, dying in 1842.

OHIO
COLUMBUS
Springfield
Dayton
Toledo
Cleveland
Akron
Canton
Youngstown
Mansfield
Zanesville
Chillicothe
Portsmouth
Marietta
Cincinnati
Lake Erie
Lake St. Clair
MICHIGAN
ONTARIO
INDIANA
KENTUCKY
WEST VIRGINIA
Ohio R.
Scale of Miles
Longitude 83° West from Greenwich

Ohio (ō-hī'ō), a river of the Mississippi valley, formed by the confluence of the Allegheny from the north and the Monongahela from the south, at Pittsburgh, in Pennsylvania, where it is a navigable stream 600 yards broad. It flows W. S. W., separating the States of Virginia and Kentucky on the south from Ohio, Indiana and Illinois on the north, and enters the Mississippi at Cairo. Its length from Pittsburgh to its junction with the Mississippi is 975 miles; area of basin, 214,000 square miles. The width of the river varies from 400 to 1400 yards; average width, about 800 yards, at its mouth 900 yards. Its principal affluents are the Miami, Kentucky, Wabash, Green, Cumberland and Tennessee.

Ohio, one of the United States, which ranks fourth in point of population, is bounded on the north by Lake Erie and the State of Michigan, west by Indiana, south by West Virginia and Kentucky, east by West Virginia and Pennsylvania; area, 41,060 square miles. In the north the surface is generally level, and in some places marshy; in the east and southeast it is rugged and broken by hills, but never rises into mountains. In its natural state Ohio was covered with dense forests; now they cover but about one-fifth, the trees most abundant being several varieties of oak, maple, ash, black and white walnut, chestnut, beech, poplar, sycamore, linden, etc. The drainage is divided between the Ohio and Lake Erie, the watershed which crosses the State being about 600 feet above lake level. The State forms a plateau of about 800 to 1000 feet above sea level. The Ohio, which receives the far larger share of the drainage, bounds the State partly on the east and wholly on the south, and is augmented from within it by the Mahoning, Beaver, Muskingum, Hockhocking, Scioto and the Great and Little Miami; the former, which washes the northern frontier for 100 miles, receives the Maumee, Portage, Sandusky, Huron, Cuyahoga, Grand and Ashtabula. The climate in the northern parts is characterized by severe winters; the summers and autmuns are mild and agreeable. In the south the winters are very mild, the summers long and often intensely hot. The chief crops are Indian corn (the staple), wheat, oats, rye, buckwheat, barley and tobacco, while the orchard products are important. Apples thrive in some sections, and sugar beet, and other crops are cultivated. The lake fisheries are valuable. Horses, sheep, cattle and swine are reared in great numbers. The dairy product is very large, while the wool clip is one of the largest in the States. Coal underlies a large part of the State, comprising an area of 10,000 square miles, and the output is important, while petroleum, natural gas, sandstone, limestone, grindstone and gypsum are found in many districts. Ohio is an important manufacturing State, due partly to its natural resources and partly to its splendid advantages of transportation. There are over 9000 miles of railways and two canals connect Lake Erie with the Ohio River. The chief industries are iron and steel works, foundries and machine shops, slaughtering, and meat packing, flour and grist mills, printing and publishing, and automobile manufacture. For higher education, the State has 40 universities and colleges, notably Ohio State University, at Columbus (founded 1872; 7000 students); Western Reserve University, at Cleveland (founded 1826; students, 3000); Ohio University, at Athens (founded 1809; students, 4000); Cincinnati University (founded 1874; students, 3500); Oberlin College (founded 1833; students, 1800); and a number of denominational colleges and universities. Ohio was admitted into the Union in 1803. The largest cities are Cleveland, Cincinnati, Toledo, Columbus (the capital), Akron, Dayton, Youngstown. Pop. (1900) 4,157,545; (1910) 4,767,121; (1920) 5,759,394.

Ohm (ōm), Georg Simon, German physicist, born in 1787; died in 1853. He became successively professor of physics at Cologne, director of the Polytechnic at Nuremberg, and professor of physics at the University of Munich. He was the discoverer of what is known as 'Ohm's Law' in electricity (which see); and among his scientific works were *Die Galvanische Kette, Grundzüge der Physik*, etc.

Ohm, the unit of resistance to the passage of electricity adopted by the British Association. A piece of pure copper wire 485 meters long and 1 millimeter in diameter at 0° C. has a resistance of about one ohm. A 'megohm' is a resistance equal to 1,000,000 ohms, and a microhm is a resistance equal to one millionth of an ohm.

Ohm's Law, an important law in electricity, deduced by Professor Ohm, to the effect that *the intensity of the electric current is directly proportional to the whole electro-motive force in operation, and inversely proportional to the sum of the resistances in the circuit.*

Ohnet, Georges, a French novelist, born in 1848. His works, which were very popular, have the general title *Les Batailles de la Vie* ('The

Battles of Life'). Among them are *Le Maitre de Forges*, *Le Grande Marnière*, *Nimrod et Cie* and *Le Femme en Gris*.

Oïdium (ō-id'i-um), a genus of microscopic fungi. *O. Tuckeri* is the vine mildew, parasitical, in the form of a white and very delicate layer, upon the leaves and green parts of vines, and destroying the functions of the skin of the part it attacks.

Oidium.

Oil. See *Oils* and *Fuel*.

Oil-beetle, the name given to coleopterous insects of the genus *Meloë*, and the family Cantharidæ, from the oily-like matter which they exude. The perfect insects have swollen bodies, with shortish elytra, which lap more or less over each other, and have not a straight suture, as in most coleopterous insects.

Oil-bird. See *Guacharo*.

Oil-cake, a cake or mass of compressed linseed or rape, poppy, mustard, cotton, and other seeds from which oil has been extracted. Linseed-cake is much used as a food for cattle, its value as a fattening substance being greater than that of any kind of grain or pulse. Rape-cake is used as a fattening food for sheep. These and other oil-cakes are also valuable as manures.

Oil City, a city of Venango County, Pennsylvania, on the Allegheny, 132 miles N. by E. of Pittsburgh. It is the principal oil market in the Pennsylvania petroleum field, there being numerous oil wells in the vicinity and immense quantities of oil being bought and sold here. There are extensive oil refineries and various manufacturing industries connected with the trade. Pop. (1910) 15,657; (1920) 21,274.

Oil-gas, the inflammable gas and vapor (chiefly hydrocarbon) obtained by passing fixed oils through red hot tubes, and which may be used like coal-gas for purposes of illumination. The oil in its passage through the retorts is principally decomposed, with the production of ethylene, marsh-gas, hydrogen, carbonic oxide, benzine, etc.

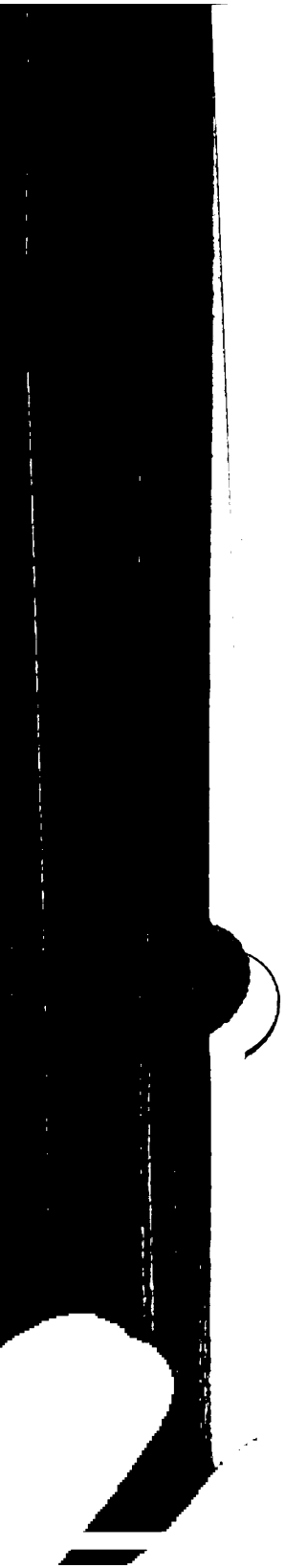
Oil of Vitriol, the common name of strong sulphuric acid (which see).

Oil-palm (*Elæis guineensis*), an African tree abounding on the west coast of that continent, whose fruit yields palm-oil. See *Palm-oil*.

Oils, the name of certain substances formed within living animal or vegetable organisms, liquid at ordinary temperatures, having a more or less viscid consistence, insoluble in and lighter than water, taking fire when heated in air, and burning with a more or less luminous flame. The oils are usually divided into the *fat* or *fixed oils*, and the *volatile* or *essential oils*. Another division would be into *vegetable oils*, by far the most numerous, and *animal oils;* and as a third popular division, the *mineral oils* (petroleum, naphtha). The fat or fixed oils are subdivided into the *drying* and the *non-drying oils*. The former class includes all oils which thicken when exposed to the air, through the absorption of oxygen, and are converted thereby into varnish, as, for example, linseed, nut, poppy and hempseed oil. All the drying oils are of vegetable origin. The *non-drying* oils (which are partly of vegetable, partly of animal origin) when exposed to the air also undergo a change resulting in the formation of acrid, disagreeably-smelling, acid substances, but though they thicken they do not become dry. The fixed vegetable oils (whether drying or non-drying) are generally prepared by subjecting the seeds of the plant to pressure, with or without heat, and they may also be extracted by means of certain solvents. The animal oils are, for the most part, the fluid parts of the fat of the animal, and are separated by heat alone. Vegetable fixed oils all consist of one or more proximate principles. Thus, olive-oil contains chiefly olein, with a little stearin; linseed-oil is composed mainly of linolein. The most important of the drying oils are linseed, hemp, walnut, poppy, candle-nut, sesame, sunflower, madia, saf-flower. Of the non-drying oils the chief are olive, cotton-seed, colza, rape, ground-nut, castor, croton, etc. A certain number of these oils are also known as vegetable fats, from their consistency at ordinary temperatures, such as palm-oil, cocoa-nut oil, shea-butter. The animal oils comprise neat's-foot oil, train-oil, sperm-oil, porpoise-oil, cod-liver oil, shark-oil, etc. The uses of the fixed oils are very various. Many are used as articles of food, others are used in medicine, numbers as lubricants, some in the composition of paints and varnishes; some are important sources of artificial light, and generally when acted on by an alkali they form soaps. A use of oil now coming into some importance is as an agent for calming the waves of the sea in certain circumstances, more especially to prevent them from breaking over a boat and so swamping her. That oil has this effect has been clearly demonstrated

SHOOTING AN OIL WELL

Petroleum has become one of the most important of the earth's resources. The United States stands first in petroleum production among the various countries; Russia and Mexico come next.



and has been actually tested in violent storms in mid-ocean.

Volatile oils are generally obtained by distilling the vegetables which afford them with water; they are acrid, caustic, aromatic and limpid; they are mostly soluble in alcohol, forming essences. They boil at a temperature considerably above that of boiling water, some of them undergoing partial decomposition. A few of them are hydro-carbons; the greater number, however, contain oxygen as one of their ultimate elements. They are chiefly used in medicine and perfumery; and a few of them are extensively employed in the arts as vehicles for colors, and in the manufacture of varnishes, especially oil of turpentine. They are very numerous, among them being the oils of anise, bergamot, clove, cinnamon, cajeput, lavender, lemon, lime, orange, mint, peppermint, nutmeg, marjoram, rosemary, thyme, etc.

Oil-tree, a name for several trees, especially the *Ricinus communis*, from the seeds of which castor-oil is expressed; and an Indian tree, *Bassia longifolia*, from the seeds of which a thick oil is expressed.

Oil-wells, wells drilled in the earth for the production of petroleum. The first oil well drilled in the United States was in 1859. The present method of drilling has been evolved from the artesian-well system previously adopted for obtaining brine and water. After the selection of the site the first operation consists in the erection of the rig, the chief part of which is the derrick—four strong uprights held in position by ties and braces and resting on strong wooden sills. For drilling the deeper wells the derrick is usually at least 70 feet high, about 20 feet wide at the base, and 4 feet wide at the summit. The boiler usually employed is of locomotive type. To avoid fire it is either at first set at some distance from the well or removed to a safe distance before the drill enters the oil-bearing formation. A large boiler frequently supplies the engines of several wells.

Oise (wăz), a river in France, which rises in the province of Hainaut in Belgium, among the Ardennes, flows southwest across the department of Aisne-et-Oise, and joins the Seine on its right bank about 6 miles below Pontoise; total course, about 180 miles, 100 navigable.

Oise, a northern department in France, bounded by the departments of Somme, Seine-Inférieure, Eure, Seine-et-Oise, Seine-et-Marne and Aisne; area, 2261 sq. miles. The soil is adapted to wheat; but barley, oats and rye are considered the most profitable crops, and a great number of cattle are raised. Pop. (1906) 410,049.

Oka (ȯ-kȧ′), the name of two rivers, one in European and the other in Asiatic Russia. The former, rising in the government of Orel, joins the Volga at Nijni-Novgorod. The latter, rising in the mountains between China and the government of Irkutsk, flows N. N. E. for 400 miles, and joins the left bank of the Angara at Bratsk.

Okapi (ō-kȧ′pi), a new species of African animal first brought to notice by Sir H. H. Johnston in 1899, he having obtained the skin of the animal from Mr. K. Erikssen, a Swedish officer in the Congo Free State. This new mammal is about the size of an ox, and is a cloven-footed ruminant, with characteristics approaching both the giraffe and the zebra, but distinct from each. It is about 4½ feet high at the withers. The cheeks and jaws are yellowish-white, the ears, forehead, a line down to the muzzle, and the short and thick neck are a deep chestnut fringed with black. The colors of shoulders and body range in tone from sepia and jet black to red; the belly is blackish, the tail chestnut with a small black tuft. Zebra-like hindquarters and legs are either snow white or pale cream touched here and there with orange.

Okapi (*Okapia johnstoni*)

Okeechobee Lake (o-kē chō′bē) ('Big Water'), a large shallow lake in Southern Florida about 40 miles in length by 25 in breadth,

and with a maximum depth of 22 feet. It merges into the Everglades.

Okhotsk (o-ĥotsk'), SEA OF, an inlet of the Pacific Ocean, in Siberia, bounded E. by Kamchatka, S. by the Kurile Islands.

Oklahoma (ok-lȧ-hō-mȧ), a State of the American Union, bounded N. by Kansas, E. by Arkansas and Missouri, and S. and W. by Texas; area, 70,057 sq. miles. It comprises the original Indian Territory, out of the western section of which a territory known as Oklahoma was organized in 1899. To this was added a narrow strip of land north of the 'Texas Panhandle,' known as the 'Public Land Strip' or colloquially as 'No Man's Land,' it having remained unappropriated. The new territory was rapidly settled and its people asked for statehood in 1901. The question as to whether Oklahoma and Indian Territory should be admitted as separate States, or combined and admitted as a single State, was settled in 1906, when they were admitted as one State under the name of Oklahoma, the constitution of the new State being signed by President Roosevelt, November 16, 1907. The surface is generally rolling prairie, with plentiful timber in the eastern part. Here a great belt of forest, known as the 'Cross Timbers,' extends from the Arkansas River to the Brazos in Texas. In the south are the Wichita Mountains, connecting the east with the Ozark Mountains of Arkansas. The central part is occupied by the Chautauqua Mountains. The rivers include the Arkansas, with its affluents, the Canadian, the Cimarron, and others, and the Red River, which forms the southern boundary, separating Oklahoma from Texas. The chief crops are cotton, wheat, corn, and oats. Other products are potatoes, hay, sorghum, flax and fruits. Its livestock interests are very large. It leads all the States in oil (1919 output valued at $250,000,000) and natural gas production. Coal, lead and zinc are also worked. The University of Oklahoma (founded 1890; 4000 students) is at Norman. At Stillwater is the State Agricultural College (founded 1891; students 2000). Oklahoma City is the capital. Pop. (1900) 790,391; (1910) 1,657,155; (1920) 2,028,283.

Oklahoma City, the capital of Oklahoma, county seat of Oklahoma Co., on North Fork of Canadian River, on several railroads. It is the center of immense oil fields and a fine farming and stock-raising region; has great meat-packing plants, refineries, iron and steel works, flour and grist mills, tire-patch factories, cotton gins, compresses, oil mills, etc. The Capitol, completed 1917 at a cost of $1,500,000, is of Oklahoma granite, with a superstructure of Indiana limestone. Pop. (1910) 64,205; (1920) 91,258.

Okmulgee (ok-mul'gē), county seat of Okmulgee Co., Oklahoma, 85 miles E. of Oklahoma City. It is the business center of the Okmulgee field, one of the richest oil, coal and natural gas producing areas in the world; also center of an agricultural and stock-raising district. It has oil refineries, casinghead gasoline plants, and glass, brick, steel and iron, tool, woodwork, tank and ice factories. Value of manufactured products (1920) $31,000,000. Pop. (1910) 4176; (1920) 17,430.

Okwawa (ok-wą'wą'), sultan of the Waheehee tribe in German East Africa from 1882. He fought heroically against the German occupation of his country and rather than surrender to the invaders he committed suicide July 19, 1898. Captain Von Prince, leader of the German expedition, found his grave, dug up his bones and carried off the skull to Germany 'for scientific purposes.' In the Great war, 1914-18, the British captured German East Africa, and in the peace treaty it was stipulated that the skull of Okwawa must be returned.

Olaf (ō'laf), or ST. OLAF, one of the most celebrated of the Norwegian kings, great-great-grandson of Harald Haarfager, and son of Harald, chief of the district of Gränland, was born about 995. He was a friend of the Normans, and a zealous supporter of Christianity. When Canute the Great landed in Norway with an army, Olaf fled to Russia, and in attempting to recover his dominions he was defeated and slain at the battle of Stiklestad (1030). Since 1164 he has been honored as the patron saint of Norway. The order of St. Olaf was founded in 1847.

Olbers (ol'bėrz), HEINRICH WILHELM MATTHÆUS (1758-1840), a German physician and astronomer, notable for his observations and calculations of comets, several of which he discovered, one in 1815, which bears his name.

Oldbury (ōld'bė-ri), a town of England, in the county of Worcester, in the heart of a mining district. It has manufactures of chemicals, iron and steel works, etc. Pop. 32,240.

Oldcastle (ōld'kas-tl), SIR JOHN, Lord Cobham, was born in the fourteenth century, in the reign of Edward III, and obtained his peerage by marrying the daughter of Lord Cobham. He excited the resentment of the clergy by his zealous adherence to the doctrines of Wickliffe, whose works he collected.

OKLAHOMA
WESTERN PORTION OF OKLAHOMA
COLORADO
KANSAS
NEW MEXICO
TEXAS
Scale of Miles
0 10 20 40
Longitude West from Greenwich
C.S. HAMMOND & CO., NEW YORK

transcribed, and distributed among the people. Under Henry V he was accused of heresy; but the king, with whom he was a favorite, delayed the prosecutions against him, and tried to convince him of his alleged errors, but in vain. He was then cited before the Archbishop of Canterbury (1413), condemned as a heretic, and committed to the Tower, whence he escaped into Wales. Four years afterwards he was retaken and burned alive in St. Giles' Fields (Dec. 1417). He wrote *Twelve Conclusions*, addressed to the parliament of England.

Old Catholics, the name first assumed by a party in the Church of Rome who, led by Dr. Döllinger, professor of ecclesiastical history at Munich, refused to accept the decree of the Vatican Council of 1870, teaching and defining the universal jurisdiction and personal infallibility of the pope. Though united in protesting against the new dogma, they claim to be faithful to the ancient traditional constitution of the church; have never seceded from it, and still hold they have a joint interest in its possessions. The chief centers of the Old Catholic movement were the universities of Germany; but the movement was also set going in Switzerland, where it spread rapidly and widely. At the first Old Catholic congress, held at Munich, September, 1871, it was determined to form separate congregations for the body, and to enter into a close connection with the Church of Utrecht (the so-called Dutch Jansenists). (See *Jansenists.*) After this the Old Catholic movement spread more rapidly. At their second congress, held at Gürzenich in 1872, the Old Catholics resolved to elect Dr. Joseph Reinkens as their first bishop. At the third congress, held in 1873 at Constance, a synodal constitution was adopted. Yearly congresses have since been held, and in 1878 it was resolved that celibacy was not incumbent on priests. The Old Catholic movement in Germany was greatly aided from the first by the position taken up by the imperial government, and still more by the governments of some of the separate states. The imperial government declared the right of Old Catholics to retain what offices they held, and the emoluments of these offices, in spite of any sentence of excommunication passed on them by their bishops. The Old Catholic movement has had a similar course in Switzerland. There also the bishops unanimously supported the new dogma, and excommunicated the priests who rejected it; but there also the state intervened, and zealously protected the latter. At present the Old Catholics of Switzerland numbes about 80,000, and have a bishop residing at Bern. Those of Germany number 70,000 (their bishop residing at Bonn), while the movement has spread to some extent in France and Austria.

Oldenburg (öld'en-burg), a free state in the north of Germany, consisting of three separate and distinct territories: the republic of Oldenburg, the republic of Lübeck, and the republic of Birkenfeld; total area, 2479 square miles. (1) The first of these divisions, the republic of Oldenburg, is bounded on the north by the German Ocean, and on the other three sides by Hanover and Bremen. The country is flat; the soil marshy and sandy, with little cultivation and large tracts of heath and forest; there are no hills or lakes; the principal river is the Weser, and the internal navigation is facilitated by a new canal, which connects the Hunte and the Ems. The chief crops are wheat, oats, rye, hemp and rape. Stock breeding is extensively carried on, and there are industries connected with cotton, wool, jute, etc. (2) The republic of Lübeck, situated in East Holstein, north of the town of Lübeck, is bounded partly by the Baltic; area, 210 square miles, of which the greater part is cultivated. Chief town Eutin (pop. 4574). (3) The republic of Birkenfeld, situated in Rhenish Prussia, is a hilly country with fertile valleys; area, 194 miles; the chief towns Birkenfeld and Oberstein. Oldenburg was raised to the dignity of a grandduchy by the Congress of Vienna in 1815. It became a free state in 1918 following the European war. Pop. 483,042.

Oldenburg, a town of Germany, capital of the free state of same name, 24 miles W. N. W. of Bremen, on the Hunte (which is navigable). It has fine promenades on the site of the old fortifications, a grand-ducal palace, public library, etc. Manufactures glass, leather, earthenware, etc. Pop. 30,242.

Old Forge, a borough of Lackawanna Co., Pa., 6 miles S. W. of Scranton, on the Delaware, Lackawanna & Western R. R. Coal is mined and there are silk mills. Pop. (1920) 12,237.

Oldham (öld'am), a town of England, in Lancashire, 6 miles northeast of Manchester. It is very irregularly built, and cannot boast much of its public buildings, though it has a handsome and commodious town hall, lyceum and science and art school, free library and museum, etc. The spinning and weaving of cotton are the staple industries of the town, and employ within it and in its vicinity about

250 mills; and there are several large machine shops, foundries, tanneries, roperies, silk factories, bleach works, etc. Pop. 147,495.

Oldhamia (ōld-hā'mi-a), a fossil organism found in the Lower Cambrian rocks of Wicklow, from its branching form thought by some to be a plant, but by others ranked among the Polyzoa.

Old Red Sandstone, a geological term made popular by the writings of Hugh Miller, and applied by him to the red sandstone which underlies the carboniferous system, in contradistinction to the new red sandstone, which overlies the latter. It is now generally included in the Devonian System. See *Geology*.

Old Town, a city of Penobscot Co., Maine, on Penobscot River, and on Bangor & Aroostook and Maine Central railroads, 12 miles N. N. E. of Bangor. It has ample water power, and has manufactures of lumber, canoes, etc. Pop. (1920) 6956.

Oldys (ōl'dis), WILLIAM, bibliographer, born according to some in 1687, according to others in 1696; died in 1761. He was appointed librarian to the Earl of Oxford, remained ten years in this nobleman's service, and in 1755 was appointed Norroy king-at-arms by the Duke of Norfolk. The works by which he is best known are the British Librarian, a bibliographical treatise, and a *Life of Sir Walter Raleigh*, prefixed to his *History of the World* (1738).

Oleaceæ (ō-le-ā'se-ē), a nat. order of monopetalous exogenous plants, allied to and sometimes united with Jasminaceæ, and chiefly inhabiting temperate climates. The species best known are the olive, lilac and privet.

Olean (ō-lē-an'), a city of Cattaraugus Co., New York, on the Allegheny River, 70 miles S. E. of Buffalo. It has oil and lumber industries, and manufactures of machinery, petroleum products, leather, glass, etc. Pop. (1910) 14,743; (1920) 20,506.

Oleander (ō-lē-an'dėr), a plant of the nat. order Apocynaceæ, genus *Nerium*, the *N. Oleander*, known also by the name of rose-bay, a beautiful evergreen shrub, with flowers in clusters, of a fine rose or white color but of an indifferent odor. The plant, especially the bark of the root, is medicinal and to some extent poisonous.

Oleaster (ō-lē-as'tėr), *Elæagnus hortensis* (order Elæagnaceæ), also called wild olive tree, a small tree of the south of Europe and west of Asia, often cultivated in gardens and shrubberies for its blossoms, which are very fragrant. It flowers in May.

Olefiant Gas (ō-lē'fi-ant), the name originally given to ethylene or heavy carburetted hydrogen. It is a compound of carbon and hydrogen in the proportion expressed by the formula C_2H_4, and is obtained by heating a mixture of two measures of sulphuric acid and one of alcohol. It was discovered in 1796. It is colorless, tasteless and combustible, and has an aromatic odor not unlike that of oil of caraway.

Oleic Acid (ō-lē'ik), ($C_{18}H_{34}O_2$), an acid resulting from the action of olive and some other oils upon potash. It enters largely into the composition of soaps, forming with potash soft soap and with soda hard soap.

Olenek (ā-lye-nyok'), a river of Northern Siberia which rises under the polar circle, and enters the Arctic Ocean to the west of the Lena delta; length, about 1200 miles.

Oleomargarine (ō-lē-ō-mär'ga-rin), an artificial butter. See *Margarine*.

Oléron (ō-lā-rōn), an island of Western France, about 1 mile from the coast of the department of Charente-Inférieure, to which it belongs. Greatest length, 18 miles; greatest breadth, 7 miles; area, 96 square miles. With the exception of the west side the surface is generally fertile, producing good corn and wine. It has two towns, Château and St. Pierre, the former fortified. Pop. 17,033. —What are known as the laws of Oléron were a code of maritime laws which long regulated the navigation connected with La Rochelle, Bordeaux, and the coasts of Normandy and Brittany, and were also adopted in other countries, as Spain, the Netherlands and England. These laws were compiled about the end of the eleventh or the beginning of the twelfth century.

Olfactory Nerves (ol-fak'tu-ri), the nerves of smell, the first pair of cerebral nerves or nerves from the brain. They arise chiefly in connection with the cerebral hemispheres, and numerous filaments from them, perforating the ethmoid bone, are distributed over the mucous membrane of the nose. See *Nose*.

Olhão (ol-yă'ụn), a seaport of Portugal, province Algarve. It is actively engaged in fisheries. Pop. 10,009.

Oli'aros. See *Antiparos*.

Olibanum (ō-lib'a-num), a gum resin used as incense, and obtained from the tree *Boswellia serrata*. It is yellow of color, bitter in taste, and

diffuses an aromatic odor when burned. See *Frankincense.*

Olifant River. See *Elephant River.*

Oligarchy (ol'i-gär-ki; from Gr. *oligos*, few, and *archē*, government), that form of government in which the supreme power is placed in the hands of a small exclusive class.

Oligocene (ol'i-gō-sēn), a geological system of the Tertiary age, lying between the Eocene and Miocene systems, and formerly included in these. Its strata is widely distributed and rich in fossils, largely composed of modern genera, though with many strange mammalian forms.

Oligoclase (ol'i-gō-klās), a soda lime felspar, the soda predominating; it occurs in granite, porphyry, and other igneous rocks.

Olinda (ō-lēn'da), a seaport town of Brazil, in the province of Pernambuco, on the Atlantic, 3 miles north of Recife, with which it unites in forming what is commonly called the city of Pernambuco. Pop. 8000.

Oliphant (ol'i-fant), LAURENCE, son of Sir Anthony Oliphant, chief-justice of Ceylon, was born in England in 1829; died in 1888. He studied law at the University of Edinburgh, traveled extensively in Southern Russia and the Crimea; became private secretary to Lord Elgin when he was governor-general of Canada, and subsequently accompanied him (1857) on his mission to China and Japan. Returning to Europe he became Paris correspondent to the *Times;* entered parliament for the Stirling Burghs in 1865, but retired three years later; and, after his attempt to found a Socialistic religious community in Portland, New York, had failed, he resided principally in Palestine, near Mount Carmel. Besides frequent contributions to periodical literature he published *Journey to Khatmandu, The Russian Shores of the Black Sea, Minnesota and the Far West, The Transcaucasian Campaign of Omer Pasha,* and various other works, including *Altiora Peto* (a novel), *Masollam* (a novel), *Sympneumata* and *Scientific Religion,* the last works exhibiting his peculiar mysticism and tendency to spiritualism. These mystical views led him in later life, in common with his mother, Lady Oliphant, to join the ascetic community of the American mystic, Thomas Lake Harris. He died in 1888.

Oliphant, MRS. MARGARET, maiden name Wilson, novelist; born near Musselburgh, Scotland, in 1820. Her first work of fiction appeared in 1849 under the title of *Passages in the Life of Mrs. Margaret Maitland,* and from that time she maintained a high place as a novelist by such works as *Adam Graeme, The Chronicles of Carlingford,* etc. Besides this fictional work she wrote a *Life of Edward Irving,* a *Life of Francis of Assisi, Memoir of Count Montalembert,* biographies of Molière, Cervantes and Sheridan, *Historical Sketches of the Reign of George II, The Makers of Florence, The Makers of Venice,* a *Literary History of England* and a *Memoir of Principal Tulloch.* She died in 1897.

Oliva (ō-lē'vä), a village in Prussia, in the province of East Prussia, not far from Dantzig. In a Cistercien abbey in this village a peace was concluded, May 3, 1660, which terminated the war between Sweden, Poland, the emperor, and Brandenburg. Pop. 5682.

Olivarez (o-le-vä'reth), GASPAR DE GUZMAN, COUNT OF, Spanish statesman, born in 1587; died in 1645. He was educated at the University of Salamanca, afterwards appointed gentleman of the bedchamber to the Prince of Asturias, and when his royal master succeeded to the throne as Philip IV, Olivarez was appointed prime minister. For twenty-two years (1621-43) his power was almost unlimited, but the severity of his administration ultimately caused revolt in Catalonia and Andalusia, while the Portuguese threw off the Spanish yoke. The end of his policy was public discontent and his own private disgrace. He was confined by the king at Toro, where he died.

Olive (ol'iv), a fruit tree of which there are several species, the most important being the common olive (*Olea europæa*, nat. order Oleaceæ). It is a low branching evergreen tree, in height from 20 to 30 feet, with stiff narrow dusky-green or bluish leaves. The flowers are small and white, and are produced in axillary racemes, and appear in June, July and August. The fruit is a berried drupe of an oblong spheroidal form, with a thin, smooth, and usually blackish skin, containing a greenish soft pulp adherent to a rough, oblong, and very hard stone. It is bitter and nauseous, but replete with a bland oil. The olive is a native of Syria and other Asiatic countries, and flourishes only in warm and comparatively dry parts of the world. It grows slowly, and is very long-lived. The olive tree has in all ages been held in peculiar estimation. It was anciently sacred to Minerva. Olive wreaths were used by the Greeks and Romans to crown the brows of victors, and it is still universally regarded as an emblem of peace The wood of the olive

tree is beautifully veined, and has an agreeable smell. It is in great esteem with cabinet-makers on account of the fine polish of which it is susceptible. But the olive tree is principally cultivated for the sake of its oil, which is contained in the pericarp or pulp. (See *Olive-oil.*) It is cultivated for this purpose in Italy, France, Spain, Malta, Turkey, the Ionian Islands, California, Florida, etc., and easily propagated either by seed, grafting, or slips. It is very tenacious of life. The fruits are also used at table, not in the natural state, but generally pickled, the green unripe fruits being deprived of part of their bitterness by soaking them in

Olive (*Olea europæa*).

water, and then preserved in an aromatized solution of salt. Another species of olive, the *O. fragrans*, inhabits China, Japan and Cochin-China. The flowers are used by the Chinese to mix with and perfume their tea, and also, together with the leaves, for adulterating tea. The only American species (*O. americāna*) is in some districts called *devil-wood*, on account of the excessive hardness of the wood and the extreme difficulty of splitting it.

Olivenza (ō-lē-vān'tha), a town of Spain, province of Badajoz, on the left bank of the Guadiana, 15 miles south of the town of Badajoz. Pop. 9066.

Olive-oil, a fixed oil obtained by expression from the pulp of the ripe fruit of the olive (*Olea europæa*). It is an insipid, inodorous, pale-yellow or greenish-yellow, viscid fluid, unctuous to the feel, inflammable, incapable of combining with water, and nearly insoluble in alcohol. It is the lightest of all the fixed oils. Olive-oil is much used as an article of food in the countries in which it is produced, and to a smaller extent in other countries, to which it is exported also for medicinal and manufacturing purposes, etc. The best olive-oil is said to be made in the vicinity of Aix, in France; the kind known by the name of Florence oil is also of a superior quality, and is mostly used for culinary purposes. By far the largest portion of olive-oil brought to the United States is imported from Italy. Spain also sends a large quantity. The oil is also known as *Sweet-oil.*

Olives, Mount of, or **Mount Olivet,** a hill on the east side of Jerusalem, from which it is separated by the Valley of Jehoshaphat and the brook Kedron. The principal summit has the name of Mount of Ascension, and here stands the modern Armenian church of that name. But according to the Scripture the scene of the ascension was near to Bethany (Luke xxiv, 50), which is on the further side of the hill from Jerusalem. A short way above Bethany is a nearly flat part of the hill on which hundreds of people might congregate, and there is little doubt that that is truly the place from which our Lord ascended. At the foot of the hill lay the Garden of Gethsemane, and round its eastern and southern side is the road by which our Lord made his triumphal entry into Jerusalem.

Olivetans (o-liv'e-tanz), an order of Benedictine monks and nuns founded about the beginning of the fourteenth century by Tolomei of Siena in Italy, and named from Monte Oliveto Maggiore near that city, where their first monastery was erected.

Olivine (ol'i-vēn), called also *chrysolite*, is a mineral, olive-green in color, occurring in lava, basalt, and certain meteorites. Analysis proves it to be silicate of iron and magnesium, agreeing with the general formula $(Mg. Fe)_2SiO_4$.

Olla Podrida (ol'a pō-drē'da), the name of a favorite dish with all classes in Spain. It consists of a mixture of all kinds of meat cut into small pieces, and stewed with various kinds of vegetables. Hence the term is also applied to any incongruous mixture or miscellaneous collection.

Ollivier (o-liv-i-ā), Emile, born at Marseilles in 1825; studied for the bar and became an advocate at Paris in 1847; took part in the revolution of 1848, and was appointed commissary-general at Marseilles under the republic. He afterwards entered the legis

lative assembly, where he became one of the leaders of the Liberal opposition. When the empire was established in France Ollivier gradually severed himself from his former political associates, and the severance was final when he, in January, 1870, accepted the invitation of Napoleon III to form a ministry. It was this ministry which declared war with Germany in July, 1870, and which, as a result of the repeated French disasters, was overthrown with disgrace in August, 1870. He died August 20, 1913.

Olmsted (olm'sted), FREDERICK LAW, landscape architect, was born at Hartford, Connecticut, in 1822; died in 1903. With Calvert Vaux he prepared the design for Central Park, New York. He was consulted about the park systems of Boston, Chicago, Buffalo and other cities, the United States Capitol grounds, and the grounds of the World's Columbian Exposition at Chicago. His son, of the same name, born in 1870, has been prominent in work of the same nature and is landscape artist of the park system of Boston.

Olmütz (ol'mŭts), a city of Moravia, Czechoslovakia, 41 miles N. E. of Brünn, on the river March, which forms almost a complete circle around it. It has a cathedral, a fine Gothic building erected by King Wenzel III, who was murdered here in 1306; and its manufactures are chiefly of linen and woolen cloth. Olmütz was formerly the capital of Moravia. Pop. 22,245.

Olney (ol'ni), RICHARD (1835-1917), an American cabinet officer, born at Oxford, Mass., graduated from Brown University in 1856. He practised law in Boston. In 1893 he was appointed Attorney-general by President Cleveland, and in 1895, Secretary of State. He was active in settling the Venezuelan boundary question in 1896.

Olney, county seat of Richland Co., Illinois, 63 miles S. W. of Terre Haute, Ind. It is in the center of the fruit belt and has railroad shops, foundries, etc. Pop. 4491.

Olonets (o-lō'nyets), a northern government of Russia; area, 57,439 square miles. The surface is generally flat; the drainage is shared in unequal proportions between the Baltic, White Sea, and Volga. The most marked natural feature of the government is its lakes (of which Omega is one), streams, and morasses. The climate is rigorous in the extreme. Timber constitutes almost the whole wealth of the government. The chief means of support of the inhabitants are forestry, hunting and fishing. The capital is Petrozavodsk. Pop. 401,100.

Oloron (ō-lō-roŋ), a town of France, department of Basses-Pyrénées, 14 miles southwest of Pau, on a hill near the Gave, here crossed by a lofty bridge connecting Oloron with Sainte Marie. It has manufactures of cutlery, blankets, etc. Pop. 7482.

Olot (ō-lōt'), a town of Spain, in Catalonia, province of Gerona, 55 miles north of Barcelona, in a basin nearly enclosed by a circle of volcanic hills. There are cotton and woolen manufactories, tanneries, etc. Pop. 8017.

Ols. See *Oels.*

Olympia (ō-lim'pi-a), county seat of Thurston County, Washington, and capital of the State, is situated at the southern extremity of Puget Sound, 45 miles S. W. of Seattle. It has abundant water-power and is in the midst of a rich timber region, for which it is the log market. There is an important oyster industry. Pop. (1920) 7795.

Olympia, a locality in Greece, the scene of the famous Olympic games, a beautiful valley or plain lying in the middle portion of the ancient district of Elis, in the western part of the Peloponnesus (Morea). Here were collected thousands of statues of the gods and of victors in the games, treasure houses full of votive offerings, temples, altars, tombs, and in a word the most precious treasures of Grecian art. Among the buildings were the Olympiĕum or great temple of Zeus, containing the colossal statue of the god by Phidias; the Heræum or temple of Hera; the Metroum or temple of the mother of the gods; the twelve treasure houses; the Prytanēum, in which the Olympic victors dined after the contests; the Bouleuterion, in which all the regulations regarding the games were made; and these were all surrounded with walls, having a length of about 1800 feet and a breadth of 1500. Recent excavations have brought to light numerous valuable fragments of sculpture, bronzes, coins, terra cottas, etc.

Olympiads (ō-lim'pi-adz), the periods of four years between each celebration of the Olympic games, by which Greeks computed time from 776 B.C., the first year of the first Olympiad, till 394 A.D., the second year of the 293d Olympiad.

Olympias (ō-lim'pi-as), the wife of Philip II, king of Macedonia, and the mother of Alexander the Great. Her haughtiness, and more probably her infidelity, led Philip to repudiate her, and to marry Cleopatra, the niece of King Attalus. The murder of Philip, which soon followed this disgrace (B.C.

336), some have attributed to the intrigues of Olympias. After the death of her son and his successor, Antipater, she was besieged by Cassander in Pydna, and, having to surrender, she was put to death after a mock trial (316 B. C.).

Olympic Games (ō-lim'pik), the great national festival of the ancient Greeks, celebrated at intervals of four years in honor of Zeus, the father of the gods, on the plain of Olympia (q. v.). The name is also applied to modern revivals of the ancient Greek games, in which contestants from all over the world take part. They have hitherto taken place as follows: Athens, 1896; Paris, 1900; St. Louis, 1904; Athens, 1906; London, 1908; Stockholm, 1912; Belgium, 1920. The war interfered with the holding of contests in 1916, but in 1920 was held the seventh revival of the Olympic games. These consisted of track and field events, swimming, rowing, trap and rifle shooting, hockey, tennis, pistol and revolver matches, and figure skating. The United States won 212 points; Finland came next, with 105 points.

Olympus (ō-lim'pus), the name given to several mountain ranges by the ancients. The most celebrated of them was situated in Thessaly, at the eastern extremity of the range called the Cambunian Mountains, and now called by the Greeks Elymbos or Olymbos. It rises to the height of 9700 feet above the level of the sea, and was the highest mountain in ancient Greece. The earliest Greeks looked upon it as the highest of all mountains, as the central point of the earth's surface, and as the place where the gods dwelt. In after-times, when the ideas of men respecting the universe and the gods were enlarged, the supreme beings were said to reside in the exterior sphere of the heavens, evolving round the space which embraced the planets; and this new abode of the gods above the firmament of heaven received the name of Olympus. The other most important elevation bearing this name was the Mysian Olympus, a range of lofty mountains in the northwest of Asia Minor.

Olyphant (ol'i-fant), a borough of Lackawanna Co., Pennsylvania, about 8 miles N. N. E. of Scranton and 8 miles from Carbondale. It is a coal-mining town. Pop. 10,236.

Om (ōm), a mystic word to which great sanctity is attached both by the Brahmans and the Buddhists.

Omaha (ō'ma-hą), the metropolis of Nebraska, county seat of Douglas Co., situated on Missouri River, 498 miles W. of Chicago, on 13 national highways. It is the trade center of a wealthy inland empire and is called 'the Gate City of the West.' It is the first city of the United States in butter and pig lead production; second in receipts of corn and livestock; fourth railroad center; fourth in per capita bank clearings, which exceed $3,000,000,000 annually. The annual amount of manufacturing is over $460,000,000; annual jobbing business over $350,000,000. The important factors in Omaha's growth were its choice by President Lincoln as the eastern terminus of the Pacific Railroad, the establishment of the stockyards in 1884, the Trans-Mississippi Exposition of 1898, the opening of the Grain Exchange in 1904, and its selection as the half-way station of the transcontinental ærial mail service in 1920. It is the home of Fort Crook and Fort Omaha, the latter the largest balloon school in the U. S. Among its institutions are Creighton University (R. C.); Presbyterian Theological Seminary; and others. Omaha derives its name from the Omaha Indians, a tribe of the Dakotas. The first settlement was made here in 1854; incorporated as a city in 1857. It was the capital of the State from 1854 to 1867. Pop. (1900) 102,555, (1910) 124,096; (1920) 191,601.

Oman (o-măn'), an independent state in S. E. Arabia. It extends along the south shore of the Gulf of Oman from the entrance into the Persian Gulf to the extreme eastern point of Arabia. It has a coast line of nearly 1000 miles. The chief features of the country are stretches of barren sand or rock, mountains reaching the height of 10,000 feet; fertile valleys and plains. Exports are principally dates, fruit, fish, limes, cotton goods, hides and skins. Area, 82,000 sq. miles; pop. about 500,000, mostly Arabs. The capital is Muskat.

Omar I (ō'mär), successor of Abu-Bekr, and second caliph of the Mussulmans after Mohammed. He was born about 582, became a follower of Mohammed about 615, and succeeded Abu-Bekr in 634. In 638 the conquest of Syria was completed by his general, Abu-Ubeida; his general, Amru, was equally successful in Egypt in 638 to 640; and when in 638 Jerusalem was compelled to surrender, Omar hastened thither himself in order to dictate the terms. Omar's generals likewise invaded Persia, defeated the army of Yezdegerd, and conquered the capital and kingdom. The Mussulmans pursued their conquests far into Africa, but Omar did not live long to enjoy his glory. In 644 he was mortally wounded at Medina by a slave. He established the custom of dating from the Hejira, and founded many excellent institutions.

Omar Khayyam (kī-yam'), a Persian poet, astronomer and mathematician, born at Nishapur in Khorasan; died there in 1123. His scientific works, which were of high value in their day, have been eclipsed by his *Rubaiyat*, a collection of about 500 epigrams in praise of wine, love, and pleasure, and at the same time depressingly pessimistic. A portion of the *Rubaiyat* was translated into English verse by Edward Fitzgerald (1859-79), and a critical text and translation was made by E. H. Whinfield in 1883. Other translations have been made and the work has become highly popular.

Omar Pasha. See *Omer Pasha.*

Omasum (ō-mā'sum), the third compartment of the stomach of ruminant mammals, otherwise known as the psalterium or 'manyplies.'

Ombay (ōm-bī'), an island in the Indian Archipelago, about 18 miles northwest of Timor. It is about 1500 square miles in extent, and is chiefly inhabited by Malays and Papuans. There is a Dutch settlement, with a trade in pepper, birds'-nests, etc.

Omega (ō-meg'a; Greek, signifying 'great *o*'), the name for the Greek long *o*. It was the last letter in the Greek alphabet, as alpha was the first; and from the expression in Revelation (chap. i, 8), 'I am Alpha and Omega, the beginning and the ending,' the signs A Ω became with the Christians symbolical hieroglyphics. Inscriptions on tombstones, public documents, etc., very often began with these two letters, meaning, 'In the name of God.'

Omens (ō'menz), certain signs or phenomena supposed to portend some impending good or evil fortune. Among the ancient Romans the taking of omens was a public institution of great importance. See *Augurs, Auspices.*

Omer (ō-mėr), St., a town in France, in the department of Pas-de-Calais, in a marshy district on the Aa, which is here navigable 23 miles southeast of Calais. It ranks as a fortress of the first class, and it has a fine cathedral, and remains of the abbey church of St. Bertin, at one time the noblest Gothic monument of French Flanders. It manufactures woolen cloth, thread, starch, etc., and has an important trade. Pop. 16,882.

Omer Pasha (o'mer pa-shä'), a Turkish general, born in the Austrian dominions in 1806; died at Pera in 1871. Under his original name of Mikail Lattas he served for some time in an Austrian regiment; fled afterwards, for an unknown reason, into Bosnia; adopted the Mohammedan faith; taught writing in a military school; and ultimately became teacher to Prince Abdul-Medjid. When his pupil became sultan, Omer rapidly rose in rank; distinguished himself in the Syrian campaign of 1840; became military governor of Lebanon; quelled various revolts in Bosnia, Albania, etc.; and in the Russian campaign of 1853 he was appointed commander-in-chief of the Turkish army. In this capacity he made a successful stand against the Muscovite invasion, defeating the Russians at Kalafat on the Danube and at Eupatoria in the Crimea. He retired from public life in 1869.

Ommiades, or **Ommeyades** (om'i-ădz), the second dynasty which held the Arabian caliphate until they in turn were superseded by the Abbasides. The founder of the dynasty was Moawiyah, who claimed the throne after the death of Othman, his cousin, and became fully recognized as caliph after the death of Ali his rival and Hussein his son. See *Caliph.*

Omnibus (om'ni-bus), a Latin word signifying 'for all,' and now applied in several languages to the well-known vehicle used for the conveyance of passengers at a cheap rate. The first conveyances of the kind were those which came into use in Paris (March, 1662) in consequence of an edict of Louis XIV, but they soon fell into disuse, and were not again reintroduced until 1827. A Mr. Shillibur started the first omnibus in London in 1829, and they were introduced into New York in 1830, and Amsterdam in 1839. They have been superseded very generally by the street car.

Omphale (om'fa-lē), in ancient Greek legend, a queen of Lydia. Hercules was sold to her for a slave by Hermes (Mercury), and performed some remarkable exploits in her service. Omphalē governed with great severity, and was both licentious and cruel.

Omsk (omsk), a chief town in the Russian government of Akmolinsk, situated in Western Siberia at the junction of the Om with the Irtish, 280 miles southeast of Tobolsk. It is an important military station, contains a school for interpreters and a military school for the Cossacks and has a good trade. Pop. (1911) 129,422, including many exiles.

On. See *Heliopolis.*

Onager (on'a-gėr), the wild ass (*Equus Asinus*), originally inhabiting the great deserts of Central Asia, and still found there in its wild state. See *Ass.*

Onagraceæ (on-a-grā'se-ē), a nat. order of polypetalous exogenous plants, herbs, trees and shrubs, with opposite or alternate simple leaves, and often handsome flowers. They have an inferior ovary, and all the parts of the flower are four or a constant multiple of that number. The species chiefly inhabit the more temperate parts of the world, and have white, yellow, or red flowers; such as the great American genus *Œnothĕra* or evening primroses, the common wild willow-herbs (*Epilobium*), and the fuchsias of our gardens.

Onega (ō-nē'ga), a river in Russia, which, issuing from Lake Latcha, government of Olonetz, flows first northeast, then northwest, and after a course of about 270 miles falls into the White Sea at the southeast extremity of the Gulf of Onega.

Onega, a lake in Russia, near the center of the government of Olonetz, and, after Lake Ladoga, the largest lake in Europe, covering an area of about 3800 sq. miles. It has numerous creeks, bays and islands; is well supplied with fish; and discharges itself into Lake Ladoga by the Svir.

Oneglia (o-nel'yȧ), a seaport of North Italy, province of Porto Maurizio. Pop. 10,000.

Oneida (ō-nī'da), a city of Madison Co., New York, 5 miles from Oneida Lake, 26 miles E. of Syracuse. Large quantities of hops and dairy products are shipped, and there are silk and knitting mills, manufactures of iron, chairs, caskets, automobiles, etc. Pop. (1910) 8317; (1920) 10,541.

Oneida, a lake in the State of New York. It is 20 miles long, 4 miles broad, and its waters find a vent by Oneida River into Lake Ontario at its southeast corner, after they have united with the Seneca and formed the Oswego River.

Oneida Community, a religious communistic society, otherwise known as Perfectionists (q. v.).

Oneidas, once a North American Indian tribe inhabiting Central New York, and belonging to the Iroquois community of tribes. A remnant in Wisconsin are well advanced in civilization.

Oneonta (ōn-ē-on'tȧ), a village of Otsego Co., New York, on the Susquehanna River, 60 miles N. E. of Binghampton. It has a very large State normal school, silk and knitting mills, overalls and chemical factories, etc. Pop. (1910) 9491; (1920) 11,582.

Onion (un'yun), a well-known liliaceous plant of the genus *Allium*, the *A. Cepa*, the bulbous root of which is much used as an article of food. It is a biennial herbaceous plant with long tubulated leaves, and a swelling, pithy stalk. The peculiar flavor varies much according to the size of the bulb, the small reddish onions having much more pungency than the larger ones. The onion may be grown from the tropics to the coldest verge of the temperate zone. There are at least twenty varieties, the Bermuda, Spanish and Portuguese being among the most esteemed.

Onkelos (onk'e-los), the author of the celebrated Targum or Chaldee paraphrase of the Pentateuch which bears his name, is asserted by the Babylonian Talmud to have lived in the time of the celebrated teacher Gamaliel, but is supposed from internal evidence to be not earlier than the second and not later than the third century. His version is so faithful, and accords so exactly with the Hebrew text, that it continued till the beginning of the sixteenth century to be chanted in the synagogue alternately with the Hebrew and to the same notes.

Onomacritos (o-n-o-ma-k'ri-tos), a Greek soothsayer and poet, who lived at Athens in the time of the Pisistratidæ, arranged and explained the so-called oracles of Musæus, and having been detected making an interpolation in one of these, was banished from Athens by Hipparchus about B.C. 516. He is supposed to have been the author of the Orphic hymns.

Onomasticon (o-n-a-mas'ti-kon), a Greek term properly meaning a list of names or words, denotes particularly a dictionary or encyclopædia in which individual subjects or things are mentioned and explained under their own names or head. The oldest work under this name still extant is that of Pollux, executed in the second century B.C., in the Greek tongue.

Onomatopœia (o-nom-a-to-pē'a), the formation of words in such a manner that the sound shall imitate the sense. Thus, in the case of sounds, the words *buzz*, *crash*, *roar*, are evidently formed to imitate the sounds themselves.

Onondagas (on-on-dā'gaz), a tribe of Indians, one of the Iroquois tribes, formerly occupied the region from Onondago Lake to Lake Ontario and southward to the Susquehanna River. The remnant of them, less than a thousand in number, are settled partly in Ontario and partly in New York.

Onosander (on-o-san'dẽr), more correctly ONESANDER, a writer on military tactics who lived at Rome

in the middle of the first century after Christ, and composed in Greek, under the title of *Strategetikos*, an excellent work on the art of war.

Ontario (on-tā'ri-ō), formerly called Upper Canada and Canada West, a province of the Dominion of Canada, having on the northwest, north and east Manitoba, Kewatin, James Bay and Quebec; on the southeast, south and southwest the St. Lawrence River, the Great Lakes and Minnesota; area 407,262 sq. miles. Besides the great lakes just mentioned, which partly belong to the Dominion and partly to the United States, Ontario has numerous other lakes, such as Simcoe, Nipissing, Nipigon, and others. The chief rivers are boundary rivers; the Ottawa, Niagara and Albany, the latter entering James Bay, part of Hudson Bay. The Falls of Niagara in part belong to the province. There are no mountains of importance. Agriculture is the chief occupation, and for the most part the soil is of excellent quality. A large part of the province is covered with timber, and this, with the water facilities, makes lumbering one of the chief industries. The climate is inclined to the extreme of hot and cold during summer and winter respectively, but the dryness of the atmosphere makes it very healthy. The minerals include gold, silver, copper, iron, lead, nickel, plumbago, gypsum, marble, salt and petroleum. The richest, most thickly settled, and most highly cultivated portion of the province is the peninsula between the St. Lawrence and Lakes Ontario, Erie and Huron. Here very large crops of wheat are raised; also barley, oats, Indian corn and potatoes, and the fruit-growing farms of some districts yield a plentiful crop of apples, plums, pears, peaches and grapes. Recently the farmer here has turned his attention to stock-raising and dairy farming with encouraging results, which are largely due to the easy accessibility of markets by rail, supplemented by the lake, river and canal. Among the manufactures are agricultural implements, lumber products, iron and steel products, milling, pulp, paper, etc. Among the institutions of higher learning are the University of Toronto (founded 1827), Queen's University at Kingston, Western University at London, and Ottawa University. The provincial government is administered by a Lieutenant-Governor, a cabinet, and a legislative assembly. The capital is Toronto; other large cities are Ottawa, Hamilton and London. Pop. (1911) 2,527,292; (1921) 2,933,662.

Ontario, a city of San Bernardino Co., California, 38 miles E. of Los Angeles, in a fruit and farm region. Electrical goods are manufactured. Pop. (1920) 7280.

Ontario, LAKE, the most easterly of the great lakes of North America, lying along the northeast side of the State of New York, and forming part of the boundary between the United States and Canada; greatest length, 190 miles; greatest breadth, about 55 miles; area, 5400 square miles. It receives the waters of Lake Erie by the Niagara, and discharges its waters by the St. Lawrence into the Atlantic, 1000 miles distant. The Hudson, and the Oswego and Erie canals, form a connection through the United States between it and the Atlantic. It is navigable throughout its whole extent and at all seasons. The most important places on its shores are Toronto, Hamilton, Kingston and Coburg, in Canada and Oswego in the United States.

Onteniente (ōn-tā-nē-ān'tā), a town of Spain, in the province of Valencia, 46 miles south of the town of Valencia. It has manufactures of textiles, paper, etc. Pop. 11,430.

Ontogenesis (on-tō-jen'e-sis), in biology, the history of the individual development of an organized being, as distinguished from *phylogenesis*, or the history of genealogical development, and from *biogenesis*, or life-development generally.

Ontology (on-tol'ō-ji), the doctrine of being; a name given to that part of the science of metaphysics which investigates and explains the nature and essence of all things or existences, their qualities and attributes. It is also used as equivalent to metaphysics.

Onyx (on'iks), a semi-pellucid gem with variously colored zones or veins. Any stone exhibiting layers of two or more colors strongly contrasted is called an onyx, as banded jasper, chalcedony, etc., but more particularly the latter when it is marked with white and stratified with opaque and translucent lines. The ancients valued it very highly, and used it much for cameos, many of the finest cameos in existence being of onyx.

Onyx Marble, a very beautiful translucent limestone of stalagmitic formation discovered by the French in the province of Oran, Algeria, and first brought into general notice at the London exhibition of 1862. It is used for the manufacture of ornamental articles.

Oojein. See *Ujjain*.

Oölite (ō'o-līt), a species of limestone composed of globules clustered

together, commonly without any visible cement or base. They vary in size from that of small pin-heads to that of peas. When the grains are very distinct and well-rounded it is called roe-stone; when they are large and pea-like the rock is known as pisolite, pea-grit, or pea-stone. What is known as the Oölite or Oölitic *series* of rocks in geology, consist of a series of strata comprehending the whole of those peculiar limestones, calcareous sandstones, marls, etc., which underlie the chalk formation and rest on the Lias. It yields in England a vast quantity of excellent freestone and ironstone, and is also interesting in the highest degree for its fossils, which are numerous, varied, and in excellent condition. The strata of the series have been arranged as *Upper Oölite*, *Middle Oölite* and *Lower Oölite*. The Oölite forms the upper division of the *Jurassic System*, so called because the range of the Jura Mountains is almost entirely composed of such limestones.

Oomrawatee. See *Amraoti*.

Oonalashka, or UNALASKA (ō-nä-läs'ka), one of the Aleutian Islands (which see).

Oost (ōst), JACOB VAN, the Elder, one of the best Flemish painters, born at Bruges in 1600; died in 1671. After laying the ground of his artistic education in his native land, he proceeded to Rome, and there became the pupil chiefly or Annibale Caracci. In his youth he was so successful a copyist of Rubens and Vandyck that his copies still deceive connoisseurs.—JACOB VAN OOST, the Younger, son of the preceding, born in 1637, studied at Paris and Rome, lived above forty years at Lille, and died at Bruges in 1713. His style is more marked, and his pencil is freer than that of his father.

Oosterhout (ō'stĕr-hout), a town in Holland, in the province of North Brabant, 5 miles northeast of Breda. It has foundries, potteries, tanneries, corn mills, beet-sugar factory, and some trade in grain, cloth and timber. Pop. 13,000.

Ootacamund, or UTAKAMAND (ö-tä-kä-mund'), a sanitary station in British India, and the summer headquarters of the Madras government, situated in the Neilgherry Hills, 70 miles south of Mysore. It is 7228 feet above the level of the sea, and lies in an amphitheater surrounded by noble hills overlooking an artificial lake nearly 1½ miles long. The mean temperature is about 58° Fahr. There are a number of fine public buildings, botanic gardens, etc. Pop. 19.000.

Ootrum (ō'trum), a soft, white, silky, and strong Indian fiber, regarded as a promising substitute for flax, derived from the stem of *Dœmia extensa*, a plant of the nat. order Asclepiadaceæ. It occurs abundantly in numerous parts of Hindustan.

Opah (o'pa), a large and beautiful sea-fish (*Lampris luna* or *guttātus*) of the dory family, a native of the Eastern seas, but found in the Atlantic and Arctic Oceans, and sometimes, though more rarely, on the British coasts. It is about 4½ feet long and weighs 140 to 150 lbs. Its colors are very rich, the upper part of the back and sides being green, reflecting both purple and gold, and passing into yellowish-green below, the fins bright vermilion. The flesh is highly esteemed.

Opal (ō'pal), a precious stone of various colors, which comes under the class of pellucid gems. It consists of silica with about 10 per cent. of water, and is very brittle. It is characterized by its iridescent reflection of light. It is found in many parts of Europe, especially in Hungary, in the East Indies, etc. The substance in which it is generally found is a ferruginous sandstone. There are many varieties or species, the chief of which are: (*a*) *precious* or *noble opal*, which exhibits brilliant and changeable reflections of green, blue, yellow and red; (*b*) *fire opal*, which simply affords a red reflection; (*c*) *common opal*, whose colors are white, green, yellow and red, but without the play of colors; (*d*) *semi-opal*, the varieties of which are more opaque than common opal; (*e*) *hydrophane*, which assumes a transparency only when thrown into water; (*f*) *hyalite*, which occurs in small globular and botryoidal forms, with a vitreous luster; (*g*) *menilite*, which occurs in irregular or reniform masses, and is opaque or slightly translucent. Formerly the opal was believed to possess magical virtues; thus it was believed to confer invisibility when wrapped in a bay-leaf.

Open-bill (*Anastŏmus lamelligĕrus*), an African bird of the stork family, so named from the odd formation of the beak, which at the anterior end exhibits a gap between the mandibles as if part of them were worn away though they meet at the points. Their chief food is molluscs, and perhaps this formation of bill has something to do with the opening of the shells. Another species inhabits the East Indies.

Openshaw (o'pen-shą), a town of Lancashire, England, which may be regarded as a suburb of Manchester. Pop. 16.153.

Opera (op'e-rà), a musical drama, that is, a dramatic composition set to music and sung on the stage, accompanied with musical instruments and enriched by the accessories of costumes, scenery, dancing, etc. The component parts of an opera are recitatives, solos, duets, trios, quartettes, choruses, etc., and they are usually preceded by an instrumental overture. The lighter kind of opera in Germany, England and the United States, as well as the French *opéra comique*, is of a mixed kind—partly spoken, partly sung. The chief varieties of opera are the *grand opera* or *opera seria*, the name given to that kind which is confined to music and singing, of which the recitative is a principal feature; the *romantic opera*, or *opera drammatica* of the Italians, embracing an admixture of the grave and lively; the *comic opera*, or *opera buffa;* as well as many intermediate varieties. Though the Greek dramas were operatic in character, the opera proper is of modern date and of Italian origin, and would seem to have developed naturally from the miracle-play of the middle ages, the first operas dating from the sixteenth century. About the close of this century the poet Rinuccini wrote a drama on the classical story of *Daphne*, which was set to music by Peri, the most celebrated musician of the age. The orchestra of this first opera consisted of four instruments, namely a harpsichord, a harp, a viol di gamba, and a lute. There was no attempt at airs, and the recitative was merely a kind of measured intonation. Monteverde, a Milanese musician, improved the recitative by giving it more flow and expression; he set the opera of *Ariadne*, by Rinuccini, for the court of Mantua; and in the opera of *Giasone* (Jason), set by Cavalli and Cicognini, for the Venetians (1649), occur the first *airs* connected in sentiment and spirit with the dialogue. The first regular serious opera was performed at Naples in 1615, and was entitled *Amor non ha Legge*. The first *opera buffa* is said to have been represented at Venice in 1624, where also the first stage for operas was erected in 1637. In 1646 the opera was transplanted to France by Cardinal Mazarin, about the same time to Germany, and somewhat later to England. In France there arose Lulli; in Germany, Keiser; in Italy, Scarlatti; and in England, Purcell, who are the chief operatic composers of the second half of the seventeenth century. The chief Italian operatic composers include, besides those already mentioned, Piccini, Jomelli, Cimarosa, Paisiello, in the eighteenth century, and Cherubini, Rossini, Bellini, Donizetti, Verdi, etc., in the nineteenth. Among the French composers are Grétry, Monsigny, Rousseau, Méhul, belonging to the eighteenth century, Boildieu, Auber, Halévy, Herold, A. Thomas and Gounod to the nineteenth. The chief recent composers of French comic operas are Offenbach, Lecoq, Hervé and Bizet. Among English composers of operas may be mentioned Arne and Shield in the last century; and of the present or recent times Balfe, Wallace, Macfarren, Sullivan, Mackenzie, Thomas and Stanford. It is the German composers, however, who have raised opera to the highest pitch of perfection, the list including such names as Handel Gluck and Mozart in the eighteenth century; Beethoven, Weber, Flotow and many others, including the most notable of them all, Richard Wagner, in the nineteenth. Meyerbeer, though German by birth, is to be classed rather with the modern French composers. Among American operatic composers may be mentioned Reginald De Koven, Walter Damrosch, Victor Herbert, and Horatio Parker, whose opera *Mona* (libretto by Brian Hooker) won the $10,000 prize given by the Metropolitan Opera House, New York, in 1911.

Opéra Bouffe (bụt), a farcical form of opera buffa in which the characters, subject-matter, and music is intended to burlesque the more serious style of opera. Offenbach was the creator as well as the chief master in this art. The comic operas of Gilbert and Sullivan, both in the character of the music and the libretti, stand by themselves.

Opera-glass, a small binocular telescope of a low magnifying power, so called from its use in theaters. The two tubes are connected together, and have their foci adjustable by turning a milled-headed screw between them. See *Telescope*.

Operculum (ō-pèr'kū-lum), literally a lid or cover, and specifically applied to a horny or shelly plate developed in certain univalve mollusca upon the hinder part of the foot, and serving to close the aperture of the shell when the animal is retracted within it. It is also applied to part of the gill-cover of fishes.

Ophicleide

Ophicleide (of'i-klid), a brass wind instrument of music invented to supersede the serpent in the orchestra and in military bands. It generally consists of a wide conical tube, terminating in a bell like that of a horn, with a mouthpiece and ten holes or ventages which are stopped by keys. Ophicleides are of two kinds,

the bass and the alto; the former has a compass of three octaves and one note, ranging from B on the third space below the bass staff to C on the third space of the treble staff, including all the intermediate semitones. The alto ophicleide (an inferior instrument) has the same extent of compass but starts an octave higher.

Ophidia (o-fid'i-a), an order of reptiles comprising the serpents. See *Serpents.*

Ophiocephalus (o f - i-ō-sef'a-lus), a genus of fishes allied to the climbing perch, and like it able to live a long time out of the water.

Ophioglossum (of-i-ō-glos'um), a genus of ferns. See *Adder's-tongue.*

Ophir (ō'fẽr), a country or city to which the Hebrews made voyages in the time of Solomon, bringing home gold, almug-wood, and precious stones. Some identify it with the Ophir mentioned in Gen. x, 29, which was apparently situated in Arabia; while others place it in India, or in Africa.

Ophite (of'It), in petrology the name applied to certain serpentine rocks of the Pyrenees, consisting chiefly of plagioclase feldspar and green amphibole.

Ophites (of'Its). See *Gnosticism.*

Ophiuchus (of-i-ū'kus), the Serpent-bearer, called also *Serpentarius;* one of the old northern constellations, representing a man holding a serpent, which is twined about him. The moderns, however, make a separate constellation of the Serpent.

Ophiuroidea (of-i-ū-roi'de-a), an order of the Echinodermata, comprising star-fishes known as brittle-stars and sand-stars. These animals have long slender-jointed arms, which may either be branched or simple.

Ophthalmia (o f - t h a l' mi-a; Greek, from *opthalmos,* an eye), an inflammation of the mucous membrane which covers the globe of the eye, and of the corresponding surface of the eyelids. It is either acute or chronic, and its commonest cause is the presence of irritating matter between the eyelids or the exposure of the membrane to sudden cold. Its characteristic marks are pain, redness, a feeling as if sand were in the eye, and a copious flow of tears.

Ophthalmology (of-thal-mol'o-ji), the science of the anatomy, physiology and pathology of the eye. See *Eye, Sight.*

Ophthalmoscope (of-thal'ma-skōp), an instrument for observing the internal structure of the eye. It consists of a mirror (plane in that of Coccius, concave in that of Desmarres), by which light from an artificial source is directed into the eye of the patient, and a double-convex lens, by which the illumined parts of the structure of the eye are magnified in order that they may be more easily examined, the observer looking through a hole in the center of the mirror. The light is usually placed to the side of and slightly behind the patient's head.

Opie (ō'pē), AMELIA, a novelist, born at Norwich, England, in 1769; died in 1853. In 1798 she married John Opie, the well-known painter, and from this period began, under the encouragement of her husband, to publish her tales of *Father and Daughter, Adeline Mowbray, Detraction Displayed,* and various volumes of poetry. In 1807 she lost her husband, and thereupon returned to Norwich, where she continued to reside until her death.

Opie, JOHN, an English painter, the son of a carpenter, born near Truro, Cornwall, in 1761; died in 1807. Having shown a precocious aptness in portrait painting, he was taken to London in his nineteenth year by Dr. Wolcot (Peter Pindar), and there he acquired notoriety as the *Cornish Wonder.* When his portrait painting ceased to be fashionable he devoted himself to historical and Scriptural subjects with such success that he became a Royal Academician in 1788, and was elected professor of painting to the Royal Academy in 1805. He was the author of a biography of Sir Joshua Reynolds in Pilkington's *Dictionary of Painters,* and his four lectures on painting, with a memoir, were published by his wife (see above).

Opisthobranchiata (ō-pis-thō-bran-ki-ā'ta), a division of Gasteropoda in which the gills are placed posterior to the heart.

Opisthoc'omus. See *Hoatzin.*

Opitz (ō'pits) or OPITIUS, MARTIN, a German poet, born in 1597; died in 1639. He studied at Frankfort-on-the-Oder and at Heidelberg, and having afterwards visited Holland he went in 1621 to the court of the Duke of Liegnitz, whence in about a year he removed to become a professor of philosophy and classical literature at the University of Weissenburg (now Karlstadt). Becoming distinguished for his talents, he went in 1625 to Vienna, where the Emperor Ferdinand II bestowed on him the poetical crown and letters of nobility, when he assumed the title of Von Boberfeld.

Among his works are a poem on *Mount Vesuvius*, *Silvæ*, *Epigrams*, etc.; but he is more important for the influence of his teaching regarding correctness in poetic style than for his own poems.

Opium (ō'pi-um), the inspissated juice of a species of poppy (*Papāver somnifĕrum*), cultivated on a large scale principally in Hindustan and in Asiatic Turkey, but well known in many places as a garden plant, being an annual with white, red or violet flowers and glaucous leaves. The opium is the juice that flows from incisions made in the green heads or seed-capsules of the plant after the fall or removal of the petals, and the best flows from the first incision. The juice is at first a milky liquid, but soon solidifies and turns black, and is then scraped off and collected. It is one of the most energetic of narcotics, and at the same time one of the most precious of all medicines, and is employed in a great variety of cases, but most commonly for the purpose of procuring sleep and relief from pain. In medicine it is very commonly used in the form of *laudanum*, which is a simple tincture or extract in spirits of wine; it is also an ingredient in various *patent* and other remedies. Another opium preparation is *morphine* (q. v.). In its natural state opium is heavy, of a dense texture, of a brownish-yellow color, not perfectly dry, but easily receiving an impression from the finger; it has a faint smell, and its taste is bitter and acrid. The chief active principle of opium is morphine, or morphine in combination with meconic acid. The principle part of our supply of opium is brought from Turkey, whence it is imported in flat pieces or cakes, covered with leaves. In the case of many temperaments opium produces such agreeable effects, whether a delightful dreamy calm, a state of pleasant exhilaration, or beatific visions, that numbers of persons are led to use it habitually, as others use alcohol in some form, though over-indulgence in it is attended with at least as evil effects as over-indulgence in the latter. But like tobacco it is taken by vast numbers without any apparent result one way or other. Some habitual takers of opium can take as much in a day as would kill ten or twenty persons unaccustomed to it. The habitual consumption of opium by persons otherwise in good health is called *opium eating*, *the opium habit*, *the morphine habit* or *morphinism*. It is taken through the mouth, injected under the skin, or (commonly in the Orient) smoked. The pipe, or rather the stem of the pipe, is about the length and size of an ordinary flute; the bowl is generally made of earthenware. The smoker, who is always lying, or at least reclining, takes a small portion of opium about the size of a pea on the end of a spoon-headed needle, heats it at a lamp, and then places it in the bowl of the pipe, the pellet of opium having previously been perforated with the needle. He then brings the opium to the flame of the lamp, inhales the smoke in several inspirations, and is then ready to repeat the process with a fresh quantity of opium until the desired intoxication ensues. Large quantities of opium were long consumed in China, a great part of which formerly came from India, though probably as much more was produced in China itself. The Indian opium, however, was preferred to their own by the best judges among the Chinese. In India it was cultivated (by private cultivators) as a government monopoly, and produced a large revenue to the government. Opium thus gave rise to the 'Opium War' of 1840-42, between England and China, arising from the destruction by Chinese authorities of a large quantity of opium imported by British merchants. Though defeated, China continued to oppose the introduction of opium, and was encouraged to take action again when the United States opposed the introduction of opium into the Philippines and finally prohibited it. Following the agreements of the International Opium Congress held at Shanghai in 1909, the Indo-China opium traffic has come to an end, India thereby sacrificing a sum of $20,000,000 annually. The opium dens of Hongkong were closed by order of the home Government in England, and in China itself vast areas under poppy cultivation were condemned and replaced by other crops. In both Europe and America stringent laws have been passed restricting the importation and sale.

Opium Poppy. (*Papāver somnifĕrum*)

Opodeldoc (op-ō-del'dok), a solution of soap and alcohol, with the addition of camphor and volatile oils. It is used externally against rheumatic pains, sprains, bruises, and other like complaints. Also called *soap liniment*.

Opoponax (o-pop'ā-naks), a fetid gum-resin of uncertain origin and unpleasant odor, occasionally imported from Persia, and used in ancient times as an antispasmodic. There is

a compound perfume which also receives this name.

Oporto (ō-pōr'tą; Portuguese, *O Porto*, the port), a large city and seaport of Portugal, the second in the country, capital of the same province of Entre Douro e Minho, on a steep declivity on the right bank and about 2 miles from the mouth of the Douro, 170 miles north of Lisbon. The river is crossed by two iron bridges of recent construction, one of them, the railway bridge, especially bold and striking. The appearance of the city on a first approach is very prepossessing, but in reality most of the streets are narrow, crooked and dirty, and the houses irregularly constructed. Among the chief buildings are the Gothic cathedral, the church of S. Francisco (Gothic), the bishop's palace, an enormous building, the English club, the exchange, and the Torre dos Clerigos, a granite tower 210 ft. high. There are also museums, a large library, medical college, Crystal Palace and fine garden, etc. The principal trade is in wine, white and red, but chiefly the latter (*port* wine, so named from this town), which is principally exported to Britain. There are some manufactories of hats, silks, cotton, woolen and linen stuffs, pottery, lace, glass, leather and paper, etc. Oporto was at one time the capital of Portugal. In 1809 Wellington drove the French out of it after the remarkable passage of the Douro. Pop. (1914) 200,000.

Opossum (o-pos'um), the name of several species of *Didelphys*, a genus of marsupial mammals, having four *hands* and a long prehensile tail. They are nocturnal animals, arboreal in their habits, living constantly on trees,

Virginian Opossum (*Didelphys virginiana*)

and there pursuing birds, insects, etc., although they do not despise fruit. The females of certain species have an abdominal pouch in which are the mammæ, and in which they can inclose their young. The best-known species of opossum is the *Didelphys virginiana*, very common in the United States. It is almost the size of a large cat, the general color whitish-gray, and the whole hair of a wool-like softness. On the ground the motions of the opossum are awkward and clumsy, but on the branches of a tree it moves with great celerity and ease, using the prehensile tail to assist its motions. When caught or threatened with danger the opossum counterfeits death, and 'playing 'possum' has on this account passed into a proverb as used to indicate any deceitful proceeding. The female has from ten to fifteen young, which are for a long time nourished in the pouch, to which they resort when alarmed. The flesh of the animal is greatly enjoyed by the negro population.

Opossum-shrimp, the popular name of several species of *Mysis*, a genus of small crustaceans. They receive their name from the females carrying their eggs and young in a pouch between the thoracic legs.

Oppeln (ōp'peln), a town in Prussian Silesia, on the Oder, 53 miles southeast of Breslau. It has an old royal castle, gymnasium, hospital, etc.; tobacco factory, cement and soap works, breweries, limekilns, and some shipping trade. Pop. (1910) 33,007.

Oppenheim (ōp'en-him), an old town of Germany, in Hesse, on the left bank of the Rhine, 12 miles south of Mainz, on the slope of a hill abounding in vineyards, a place of considerable historical importance in the Thirty Years' war and later. Pop. 3696.

Oppian (op'pi-an), the name of two Greek authors, one of whom wrote a poem entitled *Halieutica* (Fishing), and the other a poem on *Cynegetica* ('Hunting'). The author of the *Halieutica* flourished about 170 A. D. His poem consists of about 3500 lines, divided into five books. The author of the *Cynegetica* was born at Apamea or Pella, in Syria, and flourished about 210 A. D. His work, which was dedicated to the Emperor Caracalla, is composed of four books containing 2100 hexameter lines. There is also a paraphrase of a poem on *Hawking*, attributed to Oppian; but it is doubtful to which of the two it belongs.

Opposition (op-u-zi'shun), in astronomy, the situation of two heavenly bodies when diametrically opposed to each other, or when their longitudes differ by 180°. Thus there is always an *opposition* of sun and moon at every full moon; also the moon or a planet is said to be in *opposition* to the

sun when it passes the meridian at midnight. See *Conjunction*.

Opposition, in politics, the party who, under a constitutional government, are opposed to the existing administration, and who would probably come into power on its displacement.

Ops, the Roman female divinity of plenty and fertility. She was regarded as the wife of Saturn, and, accordingly, as the protectress of everything connected with agriculture.

Optative (op'ta-tiv), in grammar, that form of the verb in which wish or desire is expressed, existing in the Greek and some other languages, its force being conveyed in English by such circumlocutions as 'may I,' 'would that he,' etc.

Optics (op'tiks) is the branch of physics which treats of the transmission of light, and its action in connection with the laws of reflection and refraction, including also the phenomena of vision. A *ray* of light is the smallest conceivable portion of light, and is represented by the straight line along which it is propagated. A *pencil* of light is a collection of such rays; it is *parallel* when all the component rays are parallel to each other; *converging* when they all proceed to a single point; and *diverging* when they all proceed from a single point. The *focus* of the pencil is the point to or from which the rays proceed. Any space or substance which light can traverse is in optics called 'a medium.' When light falls on any surface a certain portion of it is *reflected* or sent back, and it is owing to this reflected light that objects are visible. When light falls upon the surface of a solid substance or medium that it can traverse (a transparent substance), one portion greater or less is directed or reflected back into the medium whence it came; another portion is transmitted through the solid medium, but undergoes a change called *refraction;* while a third portion is absorbed in the new medium. When all the minute parts of a surface give out rays of light in all directions we call it a luminous surface, whether it is self-luminous or is merely reflecting the light from a self-luminous body such as the sun. The *law of reflection* is that the angle of incidence and that of reflection are in the same plane, and that the angle of reflection is equal to the angle of incidence, and on the opposite side of the perpendicular. This law holds true whatever be the nature of the reflecting surface or the origin of the light which falls upon it. *The law of refraction* comes into operation when a ray of light passes through a smooth surface bounding two media not homogeneous, such as air and water, or when rays traverse a medium the density of which is not uniform, as the atmosphere. When the ray of light passes from a rarer into a denser medium, it is bent or *refracted* towards the perpendicular

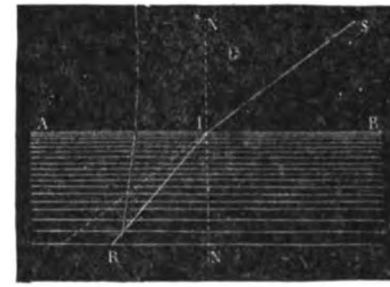


Fig. 1.—Refraction.

line drawn through the point of incidence, or the angle of refraction is less than the angle of incidence. On the contrary, when a ray of light passes from a denser into a rarer medium the refraction is from the perpendicular, or the angle of refraction is greater than the angle of incidence. If one medium is a liquid and the other air, as in the accompanying figure (fig. 1), the ray BI in the liquid will make a smaller angle with the normal NIN than the ray SI in air, and *vice versa*.

The law of reflection is illustrated especially by the action of mirrors. When a pencil of rays from a luminous point falls on a plane mirror each ray is reflected according to the law given above, and it is easy to show by geometry that the pencil which was divergent before incidence has exactly the same divergence after reflection; but the rays now seem to have proceeded from a point behind the mirror. This point is called 'the virtual image' of the first point (being not a *real* image of it); the line joining the points is at right angles to and is bisected by the mirror. Now a luminous object is made up of points, each of which sends a divergent pencil to the mirror, which seems after reflection to proceed from a point behind the mirror, and hence a luminous object sends rays to a plane mirror which after reflection seem to have proceeded from a luminous object behind the mirror. An eye receiving a ray (or a small pencil of rays) gets the impression that the luminous point from which it was sent is somewhere in the line of the ray just before reaching the eye, and hence an eye in such a position as to receive after reflection a few rays from

every point of the object sees the image of the object. (See fig. 2.) Besides plane mirrors concave and convex mirrors are often used in optics. When a mirror is not plane the incident rays from a luminous point in general neither converge to a single point after reflection nor diverge as if they had come from a virtual image. But when a concave mirror forming a small portion of a spherical surface is used we find that all the rays falling upon it from a luminous point converge so nearly to a luminous point after reflection that their 'aberration' (as the non-convergence of the rays is called) may be neglected in practice. The line joining the center of the spherical surface with the 'pole' of the mirror (that is, the middle point of the reflecting surface) is called the *principal axis*. Any bundle of rays parallel to the principal axis converges after reflection to a point in the axis called the *principal focus;* and any bundle of parallel rays converges

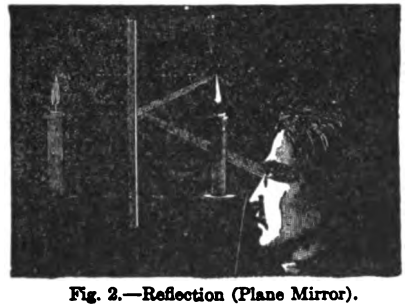


Fig. 2.—Reflection (Plane Mirror).

after reflection to a focus which is at the same distance from the mirror as the principal focal distance. When the object from which the rays proceed is at a considerable distance, an inverted image of it will be formed midway between the center of curvature and the mirror. When the object is only at a moderate distance, but exceeding half the radius of curvature, an inverted image is still formed in front of the mirror, being diminished when nearer the mirror than the object is, and magnified when farther away than the object. The image of an object placed nearer a concave mirror than the principal focus is erect and larger than the object, and is 'virtual' as in fig. 3, where A B is the object, *ba* its image (inverted), F the focus, C the center of curvature. The image of any object in a convex mirror is also virtual and erect; it is, however, smaller than the object.

When the two faces of a piece of glass through which light is refracted are both of them plain, it is called a *plate* if they are parallel, and a *prism* if they are not parallel. When the faces are curved, or one of them curved and the other plain, it is called a *lens*. Prisms are the essential parts of the apparatus used for de-

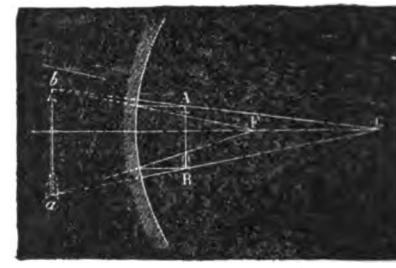


Fig. 3.—Reflection (Concave Mirror).

composing light and examining the properties of its component parts, as in spectrum analysis. (See *Light*.) A lens may be regarded as consisting of an unlimited number of prisms, the angles between their faces gradually diminishing the farther away from the axis of the lens. It is the property of convex lenses to diminish the divergency of the pencils of light, of concave lenses to increase that divergency. It is the duty of a convex lens to make rays parallel to the axis falling on one face of it converge accurately to one point after emerging from the other face. This point is called the principal focus, and is the point where a 'real' image would be formed. When rays parallel to the axis pass through a concave lens they diverge, and if produced backwards in the direction from which they come they would meet at one point, which in this case also is called

Fig. 4.—Magnification of near Object by Convex Lens.

the principal focus; but it is only a virtual focus, because the rays themselves do not pass through it, but only their backward productions. Thus concave lenses bend rays from the axis, and convex ones bend them towards it. When

we look through a concave lens it makes objects seem smaller whatever their distances are. When we look through a convex lens at an object between the lens and the principal focus it appears larger than it really is, and hence the use of such lenses in magnifying-glasses, microscopes and telescopes. The rule as to the relative size of object and image will be understood from fig. 4, where the small arrow A B is the object, and the large arrow its image, O being the center of the lens, F *f* its foci. Rays from A B are refracted towards the axis by the lens, and as the *visual angle*, or angle made by the rays at the eyes, is larger than if there were no lens, the object appears magnified. The length of the object and the image will be directly as their distance from O; so that if the image is three times as far from the lens as the object, it will be three times as long and three times as broad. *Convex* lenses are used in spectacles for long-sighted (or old-sighted) persons, because the lens of their eye is too much flattened, and does not of itself cause a sufficient convergency of the rays to make an image on the retina, but one that would fall behind it. *Concave* lenses, again, are used by near-sighted persons, because the rays in their case converge so much as to make an image in front of their retina instead of on it. See *Eye*, *Light*, *Microscope*, *Telescope*, *Spectroscope*, etc.

Optimism (op'tim-izm), that philosophical doctrine which maintains that this world, in spite of its apparent imperfections, is the best possible. It is an ancient doctrine; among modern philosophers Leibnitz is its principal advocate.

Optometry (op-tom'e-tri), the science of examining and measuring the powers of vision, chiefly with a view to correcting aberrations in refraction, accommodation, etc. (See *Eye*, *Optics*.) Although medical science in recent years has shown marvelous advance, no branch of the healing art has progressed more rapidly than optometry. The invention of instruments of precision for the physical investigation of the eye progressed to such perfection by the beginning of the twentieth century that the natural outcome was to introduce a new branch into optical science, giving us the optometrist. Defects of vision may occur from a diseased condition of the eyes or from abnormal formation of these organs. Diseased conditions are referred to the oculist. To the optometrist belongs the discovery of existing defects in refraction and their correction by accurate prescription of the glasses required. To the optician falls the duty of supplying the prescribed glasses. The latter two functions are lately often fulfilled by one and the same individual. *History.* The following chronological sequence of enactments of optometrical laws for the different states gives a view of the advance in the practice throughout the U. S. A. First to enact an optometrical law was Minnesota (1901), then followed consecutively California (1903), N. Dakota (same year); Oregon (1905); New Mexico (1906); in 1907, Arizona, Montana, Idaho, Utah, Tennessee, Indiana, Nebraska; New York (1908); in 1909, Vermont, W. Virginia, N. Carolina, Delaware, Maine, Washington, Iowa, Rhode Island, Kansas, Michigan, Florida; in 1911, Oklahoma, New Hampshire; Massachusetts (1912); in 1913, S. Dakota, Nevada, Colorado, Connecticut; in 1914, Maryland, New Jersey; 1915, Arkansas, Wisconsin; 1916, Virginia, Georgia; 1917, S. Carolina, Wyoming, Pennsylvania; 1918, Louisiana; 1919, Ohio, Illinois, Alabama; 1920, Mississippi, Kentucky; 1921, Missouri, Texas. Optometry laws have been enacted in 9 provinces of Canada and 3 provinces of Australia. Experts have estimated the present number of practicing optometrists in the U. S. A. and Canada at about 20,000.

Instruction. A course in optometry is taught in Columbia University, New York; Ohio State University, Columbus, O.; and the number of schools of optometry throughout the states are too numerous to mention here; they include such prominent institutions as: Pennsylvania State College of Optometry, Philadelphia; Massachusetts School of Optometry, Boston; Northern Illinois College of Ophthalmology, Chicago; Los Angeles (Cal.) School of Optometry; Rochester (N. Y.) School of Optometry, etc. Under the New York law, beginning in 1930, all candidates must take a four-year course in an optometry school connected with a university and leading to degrees.

Technical Equipment. Essentially necessary in every examination room are the following instruments: (1) 'Trial case,' containing plus and minus spheres and plus and minus cylinders, prisms numbered from ¼ or ½ to 20 prism diopters; trial frame to hold the lenses. (2) Skiascope or retinoscope for testing the fundus reflex (retina). (3) Ophthalmoscope (*q. v.*) for studying the media and interior of the eye and estimating its refractions. (4) Ophthalmometer, for measuring the corneal curvature. Of minor apparatus (equally necessary) are

the various forms of 'cards' for testing vision, such as those containing different sizes and kinds of letter types, signs, etc. Other instruments seen in fully equipped examination rooms are: the sphygmomanometer for testing blood pressure; the amblyoscope (specially useful in studying ocular myology) for measuring the distance of the eyes individually from the center of the nose; the perimeter and the corneal microscope; the phorometer for testing the power of the optical muscles, and so on.

Opuntia (ō-pun'shi-a), a genus of plants of the Cactus order, having stems consisting of flat joints broader above than below, but in process of growth losing this appearance. Their native country is South America. Many have handsome flowers, and some yield a pleasant sub-acid fruit. *O. Tuna* is cultivated in Mexico for the cochineal insect. See *Indian-fig, Prickly-pear.*

Or, in heraldry, the tincture that represents gold. See *Heraldry.*

Orach, ORACHE (or'ach), is the popular name of several plants of the genus *Atriplex*, order Chenopodiaceæ. A cultivated species (*A. hortensis*) is known as garden or mountain spinach, being used as a substitute for spinach.

Oracle (or'a-kl; Lat. *oraculum*, from *orare*, to pray), among the ancients, the reply of a deity or god, through an inspired priest, to some inquiry; also the place where a deity might be consulted; the holy of holies in the Jewish temple. By far the most important of the oracles of Greece, and for that matter of the ancient world, was that of Apollo at Delphi. Pytho, the ancient place of sacrifice belonging to the territory of Phocian Crissa, was situated near Delphi, on a plateau on the southern declivity of Parnassus, beneath two towering peaks, and close by a cavern from which stupefying vapors arose. It appears from the time of the Dorian migration in the possession of Apollo and connected with Apolline prophecy. A woman, who had been thrown into convulsions by the vapors, announced the oracles. She was named the Pythia and was prepared for her duty by previous ablutions in the fountain of Castalia, and being crowned with laurel, was seated upon a tripod similarly adorned, which was placed over the chasm whence the divine afflatus proceeded. Her inspired words, while thus situated, were interpreted by the priests. The announcements of the oracle by those by whom it was consulted were originally made in verse, but they were subsequently given in prose. The Pythia was a robust young woman of respectable family, daughter of a citizen or a peasant, and pledged to a chaste and quiet life. In earlier times only virgins, later, women of advanced years, were selected for this position. In the earliest period the oracle could be consulted only once a year, in the spring; but after it had grown in importance it gave replies usually on the seventh day of each month. It was usual for those who took the advice of the oracle to make rich presents to the god. By this means a vast amount of wealth was amassed at Delphi. Among the Delphic priesthood there was without doubt for centuries an honest belief that they were in a position really to discover the will of Apollo, and best able to give the expected advice. And up to a certain point they actually were able to do this. To Delphi came news, information, experiences of the most varied kind; and among the priesthood of the temple there was gradually developed a very definite tradition and a sure practice in utilizing this knowledge. Though the main purpose was to announce what was to happen in certain circumstances, Delphi wielded a decisive religious influence and took an active and important part in the improvement of morals.

Besides the oracles of Jupiter and Apollo at Dodona and Delphi, that of Trophonius, in Bœotia, may be mentioned as having been held in high estimation. There were many other oracles in Greece, but of less repute. Among the other most noted oracles of antiquity were that of Jupiter Ammon in the desert of Libya, that of the Branchidæ in Ionia, of Pella, in Macedonia, of Sinope in Paphlagonia, of the head of Orpheus at Lesbos, etc.

It appears from the edicts of the emperors Theodosius, Gratian, and Valentinian, that oracles existed and were occasionally consulted till as late as A. D. 358.

Oran (ō-răn'), a seaport of Algeria, capital of province of same name. The town rises in the form of an amphitheater, has now largely a European character, and is strongly fortified. Chief exports: cereals, esparto and alfa grass, wine, olives, etc. Pop. 123,086, of whom nearly half are French.—The province, forming a long belt along the Mediterranean, has an area of 44,616 sq. miles and a population of 1,230,195.

Orang (ō-rang'), or ORANG-OUTANG, a quadrumanous mammal, the *Pongo pygmæus*, or *Simia satyrus*, one of the anthropoid or man-like apes or monkeys. This animal seems to be confined to Borneo, Sumatra and Malacca.

It is one of those animals which approach most nearly to man, being in this respect only inferior to the chimpanzee and gorilla. It is utterly incapable of walking in a perfectly erect posture. Its body is covered with coarse hair of a brownish-red color; in some places on its back it is 6 inches long, and on its arms 5 inches. The face is destitute of hair save at the sides. It attains the height of from 4 to 5 feet, measured in a straight line from the vertex to the heel. The arms reach to the ankle-joint. The hind-legs are short and stunted, the nails of

Orang-outang (*Pithecus satyrus*).

the fingers and toes flattened. They swing themselves along from tree to tree by the aid of their long arms, but their gait on the ground is awkward and unsteady. At birth the head of the orang resembles that of the young child. These apes are remarkable for strength and intelligence, and capable of being highly domesticated if captured young. They feed chiefly on fruits and sleep on trees. See also *Man*, *Apes*, *Monkeys*.

Orange (or'inj), the fruit of the *Citrus Aurantium*, and the shrub or tree itself, nat. order Aurantiaceæ. The orange is indigenous in China, India, and other Asiatic countries, and was first introduced in Portugal about 1520. It is now extensively cultivated in Southern Europe. In Portugal and Spain the fruit forms an important article of commerce. Large quantities are produced in the Azores, in Africa, in Florida and California, also in the West Indies, Australia and the Pacific Islands. The tree is a middle-sized evergreen, with a greenish-brown bark. The leaves are ovate, acute, pointed, and at the base of the petiole are winged. The white flower exhibits a calyx with five divisions, a corolla with five imbricate petals, stamens, equal in number to the petals or a multiple of them, and along with the petals inserted on a hypogynous disc, the filaments being united in several bundles. The fruit is globose, bright yellow, and contains a pulp which consists of a collection of oblong vesicles filled with a sugary and refreshing juice; it is divided into eight or ten compartments, each usually containing several seeds. The principal varieties are the common sweet or China orange, the bitter or Seville, the Maltese or red pulped, the Tangerine, the Mandarin or clove, and the St. Michael's. The leaves, flowers and rind yield fragrant oils much used in perfumery and for flavoring essences. The wood is fine-grained, compact, susceptible of a high polish, and is employed in the arts. The citron and lemon are allied fruits.

Orange, a small and ancient principality in the southeast of France, which from the eleventh to the sixteenth century had its own princes. By the Peace of Utrecht (1713) it was ceded to France. The reigning dynasty of the Netherlands is of the house of Orange, and the heir-apparent bears the title of *Prince of Orange*.

Orange (the ancient *Arausio*), a town of France, department of Vaucluse, 18 miles north of Avignon. It was for a long time the capital of the principality of the same name, and is now chiefly celebrated for its architectural remains. Pop. (com.) 11,087.

Orange, a town of New Haven Co., Connecticut, 7 miles s. w. of New Haven. It has several manufactories. Pop. (1920) 16,614.

Orange, a town (township) of Franklin Co., Massachusetts, on Millers River, 86 miles w. of Boston. It has manufactures of sewing machines, needles, cereals, etc. Pop. (1920) 5393.

Orange, a residential and manufacturing city of Essex Co., New Jersey, 12 miles w. of New York, 4 miles n. w. of Newark. Picturesquely situated on elevated ground, it has many beautiful homes. Its industries include the manufacture of hats, calculating machines, phonographs, wearing apparel, electrical supplies, etc. It is on the Lackawanna and Erie railroads. Pop. (1910) 29,630; (1920) 33,268.

Orange, county seat of Orange Co., Texas, on Sabine River, with a 26-foot channel to the Gulf of Mexico, 32 miles distant. It has paper and saw mills, shipyards, rice mill, etc. It is a winter resort. Pop. (1920) 9212.

Orangeburg, a city, county seat of Orangeburg Co., South Carolina, on the North Edisto River, 51 miles s. of Columbia. It has rice, cotton and lumber interests, and possesses

collegiate institutions for colored students. Pop. (1920) 7290.

Orangemen, the members of a secret society founded in the north of Ireland in 1795, to uphold the Protestant religion and political ascendency, and to oppose the Catholic religion and influence and their secret societies. The title of the association was adopted in honor of William III of England, prince of Orange. The head of the association is the Imperial Grand Lodge with its imperial grand-master; then there are grand lodges, grand county lodges, district and subordinate lodges, spread over Ireland, Great Britain, United States, and some of the British colonies, especially Canada. In 1835 the society was dissolved in consequence of intrigues in the army, but revived in 1845. Great demonstrations take place annually on the 1st and 12th of July, the anniversaries of the battles of the Boyne and Aughrim, and encounters of processions of the opposite parties are apt to be the cause of serious disturbances. The Loyal Orange Institution in the United States numbers 150,000.

Orange River, or GARIEP, a river in South Africa, forming part of the north boundary of Cape Colony, and falling after a total course of about 1300 miles into the Atlantic. It has its source in the Kathlamba or Drakensburg range. Its course is winding, and it has no value as a navigable stream. The area of its basin is 325,000 sq. miles. Its chief tributary is the Vaal.

Orange River Colony, now known as ORANGE FREE STATE, Union of South Africa. It has Cape Province on S. and S. W., Bechuanaland on N. W., Transvaal on N., Natal on E., Basutoland on S. E.; area about 50,000 square miles. Pop. 526,906, of whom 175,435 are whites. It was founded in 1835–36 by Dutch settlers from Cape Colony, annexed by Britain in 1848 in order to put a stop to the Boer outrages upon natives; then in 1854 it was recognized as an independent state. In 1899 it joined the South African Republic in declaring war against Britain. The year following it was proclaimed a British colony by General Roberts. Lying about 5000 feet above the sea-level, the country, chiefly vast, undulating plains, is cold in winter, with violent thunderstorms and long droughts in summer. It is, however, very healthy and favorable to European constitutions. Pasturing is the chief occupation, and wool, hides and ostrich feathers the principal exports. Diamonds and other precious stones are found in paying quantities, valuable coal mines exist, and the colony is said to abound in mineral wealth. Gold was first discovered here in 1887. The Dutch Reformed Church is the dominant religion, and a Dutch dialect the present language of the colony. The capital is Bloemfontein, a pretty, well-built city, containing a population of 33,883. In 1909 it became a member of the Union of South Africa under its original name of Orange Free State.

Oratorio (or-a-tō'ri-ō; Italian *oratorio*, a small chapel, the place where these compositions were first performed), a sacred musical composition consisting of airs, recitatives, duets, trios, quartettes, choruses, etc., with full orchestral and sometimes organ accompaniment, the subjects being generally taken from Scripture. Its origin has been usually ascribed to St. Filippo de Neri, who, in 1570, founded the congregation of the Oratory in Rome, one of the objects of which was to render religious services as attractive as possible. Its increasing popularity induced poets of eminence to supply texts for these works. From the rude beginnings of oratorio, which might be held to exist in Emilio del Cavaliere's *Rappresentazione di amina e di corpo*, in 1600, the art progressed until it reached its high expression in the German *Passion* music, notably that written by J. S. Bach. In England Handel brought the oratorio into popularity by the sheer excellence of his productions, and he has been the inspiration to writers in this form of music to the present day. Among the most notable examples of oratorio are the *Passion According to St. Matthew*, by Bach; the *Messiah and Israel in Egypt*, by Handel; the *Creation*, by Haydn; the *Mount of Olives*, by Beethoven; the *Last Judgment*, by Spohr; *Saint Paul* and *Elijah*, by Mendelssohn. Schubert left a remarkable fragment of an oratorio called *Lazarus*. Among the oratorios by living composers may be mentioned *The Light of the World* and *The Prodigal Son*, by Sir Arthur Sullivan; *The Rose of Sharon*, by A. C. Mackenzie; *The Deluge* and *Ruth*, by F. H. Cowen. The dramatic oratorio should be distinguished from its less secular form as exemplified in the earlier German productions. The 19th century tendency toward dramatic cantata is shown in Dvorak's *St. Ludmilla* and Liszt's *St. Elizabeth* and *Christus*.

Oratory, PRIESTS OF THE, a religious order founded in Rome by St. Filippo de Neri in 1570, for the study of theology, and for superintending the religious exercises of the devout, visiting

the sick, etc. The members live in community, but are not bound by monastic vows; they are at liberty to withdraw at any time, and pay a fixed sum towards the common expenses.

Orbiculina (or-bi-kū-lē'na), a genus of minute foraminifers, found alive in tropical seas, as also fossil in the tertiaries. They derive their name from their flattened globular shape.

Orbit (or'bit), in astronomy, the path of a planet or comet; the curve-line which a planet describes in its periodical revolution round its central body. The orbits of the planets are elliptical, having the sun in one of the foci: and the planets all move in these ellipses by this law, that a straight line drawn from the center of the sun to the center of any one of them, termed the *radius vector*, always describes equal areas in equal times. Also the squares of the times of the planetary revolutions are as the cubes of their mean distances from the sun. The satellites also move in elliptical orbits, having their respective primaries in one of the foci. The *elements of an orbit* are those quantities by which its position and magnitude, for the time, are determined; such as the major axis and eccentricity, the longitude of the node, and inclination of the plane to the ecliptic, and the longitude of the perihelion.

Or'cades. See *Orkney Islands.*

Orcagna (or-kän'yä), ANDREA DI CIONE, born about 1308; died about 1386; one of the greatest of the early Florentine artists after Giotto. Painting, sculpture, architecture and mosaic work were all within the sphere of his artistic genius; and his productions compare favorably with the best of a period so rich and distinguished in the art of Italy. As a painter he executed the beautiful frescoes in the church S. Maria Norella at Florence; the chapel San Michele and its magnificent tabernacle in the same city are grand memorials of his architectural and sculptural talent. His style is remarkable for exquisite design, graceful pose, and delicate execution. Boccaccio has perpetuated his name in his *Decamerone.*

Orchard (ôr'chard), an enclosure devoted to the culture of fruit trees, especially the apple, the pear, the plum, the peach and the cherry. The most suitable position for an orchard is a declivity lying well exposed to the sun and sheltered from the colder winds, but yet not too much shut in. The soil should vary according to the kind of fruit cultivated, and it is generally allowed to produce only grass besides the fruit trees. Fruit cultivation is carried on most extensively on the continent of Europe and the United States, the apple and peach being very largely cultivated in some of the States, and yielding the finest and most delicious fruit. Canada also yields an abundance of fine apples.

Orchard-house, a glass-roofed shed designed for the cultivation of fruits to greater advantage than in the open air. The fruit trees in it are not allowed to attain any great size. They are planted in pots which have a large hole in the bottom, and through this the smaller roots pass to take nourishment from a specially prepared soil below. These roots are cut off after the fruit is gathered, and the trees then rest during the winter.

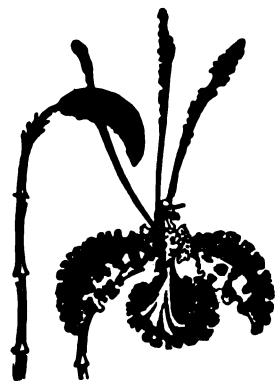
Orchardson (ôr'chard-sun), SIR WILLIAM QUILLER, painter, born in Edinburgh (1835-1910). He painted portraits and exhibited in the R. S. A. till 1863, when he removed to London. He became an associate of the Royal Academy in 1868, and full academician in 1879. He is among the first of British incident painters, a fine colorist, and most of his works are skilfully dramatic and picturesque. Among his more notable pictures are *The Challenge, Christopher Sly, The Queen of the Swords, Napoleon on Board the Bellerophon, Un Mariage de Convenance, Salon of Mme. Recamier, The First Cloud* and *The Young Duke.*

Orchella (ôr-kel'ä), the name of several species of *Roccella,* a genus of lichens, originally brought from the Levant, and employed from very early times as a dye agent. Large quantities are gathered in the maritime rocks of the Canary and Cape Verde Islands. A purple and a red dye, known as orchil or archil, are prepared from them.

Orchestra (ôr'kes-tra), the space in theaters between the seats occupied by the spectators and the stage, appropriated by the Greeks to the chorus and the musicians, by the Romans to the senators, and in our modern theaters to the musicians. The name is also used for the part of concert rooms assigned to the vocal and instrumental performers; and, lastly, is applied to the instrumental performers, collectively taken. A modern orchestra in the last sense consists of stringed, wind and percussion instruments, in varied proportions, according to the number of instrumentalists. The stringed instruments should greatly outnumber the wind instruments, and those latter the instruments of percussion.

Orchidaceæ (ôr-ki-dā'se-ē), or ORCHIDS, an extensive or-

der of endogens (nearly 2000 species being known), consisting of herbaceous plants or shrubs, with fibrous or tuberous roots; a short stem or a pseudo-bulb; entire, often sheathing leaves; and showy flowers, with a perianth of six segments in two rows, mostly colored, one, the lowest, generally differing in form from the rest, and often spiral. The essential form of these flowers is determined by the presence of this six-segmented perianth, the three outer segments of which are a kind of calyx, the three inner forming a kind of corolla. By adhesion or abortion the parts of the perianth are sometimes reduced to five or three, and springing from its sides are the six stamens whose anthers contain pollen-grains. They are natives of all countries, but very cold and dry climates produce but few species; some of them grow in the ground, but a large number are epiphytes, growing upon trees; and it is above all in the great virgin forests of South America and of the East Indies that the orchids abound. The orchids attract much attention, and are cultivated with zeal on account of the beauty or curious shapes of the flowers (which often assume the forms of reptiles, insects, and other denizens of the animal kingdom), or for their not unfrequently fragrant smells. The cultivation of orchids has of recent years become a sort of mania, large sums being often paid for new or rare varieties. The nutritive substance



Butterfly Orchid (*Oncidium Papilio*).

called salep is prepared from the roots and tubers of several species; the fragrant vanilla is obtained from two species of a genus of that name. The figure gives an illustration of one interesting species; for others see *Orchis* and *Vanilla*.

Orchil (ôr'kil). See *Archil*.

Orchis (ôr-kis), the typical genus of the order Orchidaceæ, comprising hardy perennials with tuberous fleshy roots, containing much starch; natives of Europe, temperate Asia, and a few of North America. *O. spectabilis*, a pretty

The Salep Orchis (*Orchis mascŭla*).

little plant, is found in shady woods and among rocks. *O. mascŭla* yields salep. See *Orchidaceæ*.

Orcin, or ORCINE (ôr'sin; $C_7H_8O_2$), a peculiar coloring matter obtained from orchella. When exposed to air charged with vapors of ammonia it assumes by degrees a fine violet color; when dissolved in ammonia it acquires a deep blood-red color.

Orcus (or'kus), a name among the Romans for Tartarus or the infernal regions.

Ordeal (ôr'dēal), an ancient form of trial to determine guilt or innocence, practiced by the rude nations of Europe, in the East, and by the savage tribes of Africa. In England there were two principal kinds of ordeal, *fire-ordeal* and *water-ordeal;* the former being confined to persons of higher rank, the latter to the common people. Both might be performed by deputy, but the principal was to answer for the success of the trial. Fire-ordeal was performed either by taking in the hand a piece of red-hot iron, or by walking barefoot and blindfold over glowing coals or over nine red-hot ploughshares laid lengthwise at unequal distances; and if the person escaped unhurt, he was adjudged innocent, otherwise he was condemned as guilty. Water-ordeal was performed either by plunging the bare arm to the elbow in boiling water, escape from injury being considered proof of innocence; or by casting the person suspected into a river or pond, and if he floated without an effort to swim it was an evidence of

guilt, but if he sunk he was acquitted. It was at last condemned as unlawful by the canon law, and in England it was abolished by an order in council of Henry III. As success or failure, except in a few cases, depended on those who made the requisite preparations, a wide field was opened to deceit and malice. Besides these ordeals there were a variety of others practiced in many countries, such as the corsned or hallowed morsel trial, the trial by touching the dead body of a person murdered, which was supposed to bleed if touched by the murderer, the ordeal by swallowing certain herbs and roots, etc. After the fourteenth century ordeals became more and more uncommon. In the sixteenth century only the trial of the bier was used, and this continued even into the first part of the eighteenth. In consequence of the prevalent belief in sorcery or witchcraft the ordeal by cold water was long retained in the trials of witches. These foolish customs were generally done away, but isolated cases in some of the benighted countries of Europe happened until a comparatively recent period. Ordeals are still found in many nations out of Europe, as in West Africa, and other parts of that continent. In Madagascar till lately trial by ordeal (swallowing the poison of the tree *Tanghinia venenōsa*) was in regular use. The Chinese still retain the ordeal of fire and water, and various ordeals are practiced among the Hindus.

Ordeal-bean, ORDEAL-NUT, the seed of the Calabar bean. See *Calabar Bean.*

Ordeal-root, the root of a species of plant of the genus *Strychnos*, used as an ordeal in Western Africa.

Ordeal Tree, a name of two poisonous trees; *Erythrophlœum guineense* of Guinea and *Tanghinia venenōsa* of Madagascar. See *Erythrophlœum, Tanghin.*

Order (ôr'dêr), in zoology and botany, a subdivision of a class or large division of animals or plants, which, although agreeing in the characters common to the whole class, yet are more closely allied by some very special features in their economy. It is based upon broad criteria of structure. Thus in the class Mammalia we have the order of the Quadrumana or Monkeys; in the class of Birds we have the order of Natatores or Swimming Birds, in the class of Monocotyledonous Plants the order Liliaceæ, etc. The order itself is divided into subordinate groups named genera. See *Genus.*

Ordericus Vitalis (or-dêr'i-kus vital'is), an Anglo-Norman historian, born in the neighborhood of Shrewsbury, in 1075, his mother being English, his father Norman. He received his education in the Abbey of St. Evroul (Normandy), where the name Vitalis was conferred on him, and in due time became a priest. He wrote in Latin an ecclesiastical history in 13 books, from the birth of Christ down to his own time. The later books are valuable to the historical student, as they offer a good description of the life and times of William the Conqueror, of William II, and of the first of the Crusades. He died after 1143.

Orderlies (ôr'dêr-lez), in the United States army, are privates and non-commissioned officers selected to attend upon general and other officers, for the purpose of bearing their orders and rendering other services. The *orderly officer*, or officer of the day, is the officer of a corps or regiment, whose duty it is to superintend its interior economy, as cleanliness, quality of the food, etc. An *orderly book* is provided by the captain of each company or troop, in which the general or regimental orders are entered.

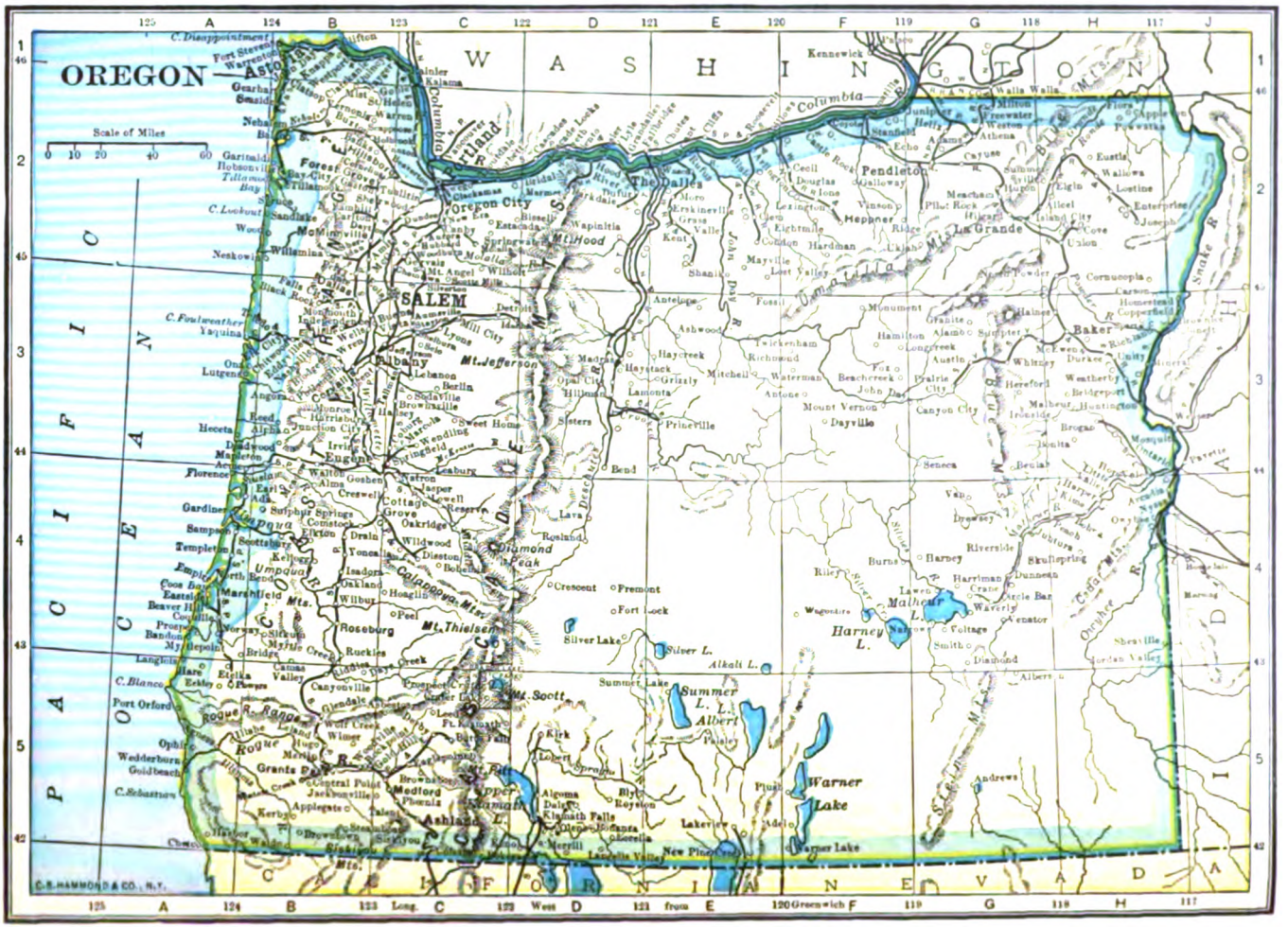
Orders, HOLY, a term applied to the different ranks of ecclesiastics. The Anglican and other Reformed Episcopal churches recognize only the three orders of bishops, priests, and deacons. The Roman Catholic Church admits of seven orders: four minor or secular—doorkeeper, exorcist, reader and acolyte; and three major—subdeacon, deacon, priest. The Greek Church has also the distinction of major and minor orders, but the functions of the four minor orders of the Roman Catholic Church are united by the Greeks in the single order of reader. The term *holy orders*, or simply *orders*, is also used as equivalent to the clerical character or position, as 'to take orders,' 'to be in orders.'

Orders, MILITARY, fraternities or societies of men banded together in former times for military and partly for patriotic or Christian purposes. Free birth and an irreproachable life were the conditions of admission. The chief were the Templars, the Teutonic Knights, and the order of St. John of Jerusalem.

Orders, RELIGIOUS, are associations, the members of which bind themselves to lead strict and devotional lives, and to live separate from the world. Prior to their formation there were only the Hermits or Anchorites. (See *Monastery.*) The entry into religious orders, from their foundation to the present time, is preceded by the taking of the

monastic vow, which enjoins residence in a monastery, celibacy, renunciation of worldly pleasures, the duty of prayer, fasting, and other austerities, and unconditional obedience to superiors. These conditions form the basis of the majority of orders, some being more austere in their observances than others. The first properly constituted religious order was founded in the fourth century by St. Basil. The Basilians are now chiefly confined to the Greek Church in the East. In the time of Justinian (530) St. Benedict established a new order, the Benedictines, under a set of rules based principally on those of St. Basil, and for some 600 years after the greatest number of European monks followed his statutes. According to some authorities as many as 23 orders sprung from this one. About 1220 the Dominicans and Franciscans originated by taking amended rules from their leaders. These rules, especially those of the Dominicans, were more austere, including perpetual silence, total abstinence from flesh, and the wearing of woolen only, and they were not allowed to receive money, and had to subsist on alms, being thus *mendicant* orders. The orders mentioned are the fountain heads of numerous others which arose to accommodate the changing times, the altered conditions of countries, and the particular policies of the church. Modified orders of the Benedictines are, for instance, the Camaldulians or Camaldolites, the Carthusians, the Celestines, the Cistercians, the Bernardines, Feuillants, Recollets, the nuns of Port Royal, and the Trappists. The reputed rules of St. Augustine were accepted by a large number of religious orders, but the monks, who were reckoned among the laity in the seventh century, could not adopt them, as they were designed for the clergy only. In the eighth century the monks began to be viewed as members of the clerical order, and in the tenth, by receiving permission to assume the tonsure, they were formally declared clergymen. Indeed, public opinion and several papal bulls placed them, as superior in sanctity, above the secular clergy, who for this reason often became monks. The Præmonstratenses, Augustines, Servites, Hieronymites or Jeronymites, Jesuits and Carmelites are regular orders, according to the rules of St. Augustine. Suborders of the Franciscans are the Minorites, Conventuals, Observantines, Fraticelli, Cordeliers, Capuchins, Minims, etc. As the secluded life of the monks, soon after the origin of monasteries, had given rise to similar associations of pious females, so nuns commonly banded together as new orders of monks arose, and formed societies under similar names and regulations. Thus there were Benedictine, Camaldulian, Carthusian, Cistercian, Augustine, Præmonstratensian, Carmelite, Trinitarian, Dominican, Franciscan nuns, and many orders of regular canonesses. There were also congregations of nuns who united with certain orders of monks without adopting their names. The Ursuline and Hospitaller nuns, or Sisters of Mercy, are female orders existing independently of any male orders, and living according to the rules of St. Augustine. Almost all the important religious orders received new accessions in the lay brethren and lay sisters, who were taken to perform the necessary labors of the monasteries, and to manage their intercourse with the world. The orders first established governed themselves in an aristocratic-republican manner. The Benedictine monasteries were long independent of one another. The Cistercians obeyed a high council made up of the superior, and other abbots and counselors, and these were again responsible to the general chapters. The four mendicant orders, the Dominicans, Franciscans, Augustines and Carmelites, at their very commencement placed themselves in a much more intimate connection with the popes. Dependent solely and immediately on Rome, they preserved the strictness of their organization with a success which could be maintained only by the unity of the ruling power and the blind obedience of the subjects. Most of the other orders soon adopted the same constitution. Accordingly at the head of every religious order stands a general or governor, who is chosen every three years from the officers of the institution, resides at Rome, and is responsible only to the pope. The counselors of the general are the officers to whom the supervision and government of monasteries is committed. See *Monastery*, and the articles on the various orders.

Orders of Architecture, the chief styles or varieties exhibited in the architecture of the Greeks and Romans. Technically the chief feature of the order is the column—including base, shaft and capital—and its superincumbent entablature (consisting of architrave, frieze and cornice). The character of the order, however, is displayed not only in its column, but in its general forms and detail, of which the column is, as it were, the regulator. There are five classic orders, namely Grecian: Doric, Ionic and Corinthian; Roman: Tuscan and Roman or Composite.


OREGON
WASHINGTON
IDAHO
CALIFORNIA
NEVADA
PACIFIC OCEAN
Scale of Miles
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SALEM
Portland
Astoria
Eugene
Albany
Corvallis
Oregon City
Roseburg
Coos Bay
Marshfield
Grants Pass
Medford
Ashland
The Dalles
Pendleton
La Grande
Baker
Ontario
Klamath Falls
Lakeview
Burns
Prineville
Bend
Redmond
Madras
Condon
Heppner
Enterprise
Joseph
Hood River
Dufur
Mt. Hood
Mt. Jefferson
Mt. Thielsen
Mt. Scott
Diamond Peak
Crescent
Fremont
Fort Rock
Silver Lake
Silver L.
Alkali L.
Summer L.
Albert
Harney L.
Malheur L.
Warner Lake
Goose L.
Abert L.
Pine Valley
Owyhee R.
Malheur R.
Snake R.
Columbia R.
Deschutes R.
John Day R.
Umatilla R.
Grande Ronde R.
Powder R.
Rogue R.
Umpqua R.
Willamette R.
Klamath R.
Coquille R.
Siuslaw R.
Yaquina
Newport
Florence
Reedsport
Gardiner
Coos Bay
Bandon
Port Orford
Gold Beach
Wedderburn
Brookings
Crescent City
C. Disappointment
C. Foulweather
C. Lookout
C. Blanco
C. Sebastian
Cascade Range
Coast Range
Blue Mts.
Wallowa Mts.
Steens Mts.
Warner Mts.
Siskiyou Mts.
Cascade Locks
The Dalles Dam
Celilo
Kennewick
Walla Walla
Milton
Freewater
Weston
Athena
Echo
Stanfield
Umatilla
Hermiston
Boardman
Ione
Lexington
Heppner
Ukiah
Meacham
Pilot Rock
Hilgard
Elgin
Island City
Cove
Union
Cornucopia
Halfway
Richland
Homestead
Copperfield
Sumpter
Granite
Hamilton
Alamo
Long Creek
Austin
Whitney
Unity
Durkee
Weatherby
Bridgeport
Huntington
Brogan
Ironside
Malheur
Vale
Nyssa
Ontario
Payette
Weiser
Mitchell
Haystack
Grizzly
Haycreek
Richmond
Twickenham
Waterman
Antone
Beavercreek
Prairie City
John Day
Canyon City
Dayville
Mount Vernon
Monument
Fossil
Shaniko
Antelope
Ashwood
Madras
Opal City
Hillman
Lamonta
Sisters
Redmond
Terrebonne
Tumalo
Bend
Deschutes
Lava
Rosland
Crescent
Fremont
Fort Rock
Silver Lake
Summer Lake
Paisley
Lakeview
Plush
Adel
Warner Lake
Andrews
New Pine Creek
Alturas
Cedarville
Likely
Eagle Rock
Pilot Rock
Pendleton
Echo
Stanfield
Umatilla
Hermiston
Boardman
Irrigon
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New Pine Creek
Alturas
Cedarville
Likely
Eagle Rock
C.S. HAMMOND & CO., N.Y.
125 A 124 B 123 C 122 D 121 E 120 F 119 G 118 H 117 J
Long. West from Greenwich

See *Architecture, Column,* and the articles on the various orders.

Orders of Knighthood.

See *Knighthood.*

Ordinal (ôr'di-nal), the prescribed form of service used at the ordination of clergy, as in the English, Roman Catholic, and Eastern churches. The ordinal of the English Church was originally drawn up in the time of Edward VI. It was altered to some extent in the reign of Queen Elizabeth, and again revised in 1661.

Ordinary (ôr'di-nâr-i), in common law, one who has ordinary or immediate jurisdiction, in matters ecclesiastical, in any place. The term is more frequently applied to the bishop of a diocese, who, of course, has the ordinary ecclesiastical jurisdiction. An archbishop is the ordinary of the whole province, having power to visit and receive appeals from inferior jurisdictions. As a nautical term an *ordinary* seaman is one not qualified to take the helm or sail the ship, and is thus distinguished from an *able* seaman.

Ordinate (ôr'di-nât), in analytical geometry, one of the lines or elements of reference which determine the position of a point. See *Coördinates.*

Ordination (ôr-di-nâ'shun), the initiating of a Christian minister or priest into his office. The English Church considers ordination as a real consecration; the high church party maintaining the dogma of the regular transmission of the episcopal office from the apostles down to the bishops of the present day. For ordination in the English Church, subscription to the thirty-nine articles is requisite. The ceremony of ordination is performed by the bishop by the imposition of hands on the person to be ordained. In most Protestant countries with a State church, ordination is a requisite to preaching; but in some sects it is not held necessary. In the Presbyterian and Congregational churches ordination means the act of settling a licensed preacher over a congregation, or conferring on him general powers to officiate wherever he may be called.

Ordnance (ôrd'nans). See *Cannon, Artillery, Howitzer, Mortar,* etc.

Ordnance Department, the department of the British government which for over 400 years provided the army and navy with arms, guns and ammunition, administered the affairs of the artillery and engineer regiments, executed fortifications and other works at home and abroad, and supplied all troops at home with forage. It was abolished during the Crimean war (May 25, 1855), and its functions divided between the war office and the Horse Guards. In the United States the Department of Ordnance is attached to the War Department, and has a Chief of Ordnance, with a large force of officers and clerks at an annual cost in salaries of $175,000.

Ordonnances (ôr'du-nan-ses), was the name given in France to decrees, edicts, declarations, regulations, etc., issued by the king or regent.

Ore (ôr), the compound of a metal and some other substance, as oxygen, sulphur, or carbon (forming oxides, sulphides, carbonates, etc.), by which its distinctive properties are disguised or lost. Metals found free from such combination and exhibiting their natural character are called *native.* Metals are commonly obtained from their ores by smelting, the ores having been previously oxidized by *roasting.* Ores are commonly found in veins or lodes. See *Mining,* and the articles on the different metals.

Oreads (ô're-adz), nymphs of the mountains in Greek and Roman mythology.

Orebro (*eu're-brų*), a town of Sweden, capital of the län or division of same name, at the western extremity of the Hjelmar Lake, 110 miles west of Stockholm. It is well built, has an old royal castle, etc., and a considerable trade with Stockholm by the Hjelmar and Maelar lakes and the Arboga Canal. It was once the residence of Gustavus Vasa and of Charles IX. Pop. 22,013.

Oregon (or'ē-gon), one of the Pacific States of the American Union, bounded N. by Washington, E. by Idaho, S. by California and Nevada, and W. by the Pacific Ocean; area, 96,699 sq. miles. The coastal strip of Oregon, 300 miles long, is generally rugged and precipitous, with few harbors, and passes inland into a partial plateau which is densely timbered except in the south, which is a prairie-like region with groves of timber. This tract is bounded by the Coast and Umpqua ranges of mountains. Between these and the great Cascade range, 100 to 150 miles inland, lies the fertile Willamette Valley, 40 miles wide and 140 long, and the Umpqua and Rogue River basins. Mt. Hood, the loftiest peak in the Cascades, is 11,225 feet high. East of the Cascades lies two-thirds of the State, a rolling country, open and dry, and admirably adapted to pastoral pursuits. In the N. E. is the beautiful Grande Ronde, a valley with 275,000 acres of fertile

land, surrounded by forest-covered mountains. Southward is a series of similar valleys. The principal river is the Columbia, which for 300 miles forms the northern border of the State, and affords steam navigation. It has numerous tributaries, many of them navigable. Oregon has a variety of minerals, but none of great importance. They include gold, silver, copper, coal, granite, iron, lead, quicksilver, platinum, nickel, cobalt, limestone, sandstone, borax, gypsum, garnet, opal, chalcedony, etc. Western Oregon has an abundant rainfall and is well adapted to agriculture, yielding the best grades of winter wheat, barley and oats, but corn does not thrive, the summer being too cool. Hay is produced abundantly and wool-growing and cattle-raising are important. Hops are a very large crop, being grown chiefly in the Willamette Valley. Fruit is a large product, especially apples, plums and prunes, which grow in the region between the Cascade and Coast mountains. Peaches and figs grow in the southwest. Flax is cultivated for seed and fiber, and yields largely. In the Willamette Valley livestock of every kind thrives. The chief crops are wheat, oats, barley, potatoes and hay, while the wool yield is very large. Salmon and trout are common in the streams and the annual salmon catch in the Columbia is very large. The principal mountain ranges are densely wooded with a great variety of trees, some of gigantic size. The great Douglas fir yields the best masts and spars in the world. This abundance of forest trees renders lumbering one of the most important industries, while the tanning of leather and making of boots and shoes, saddlery and harness are also of much value. Of animal products, those of the fisheries stand first, the salmon-canning yielding a large annual product. The University of Oregon, at Eugene (founded 1872); the Oregon Agricultural College, at Corvallis (founded 1885); Pacific University, at Forest Grove; Pacific College at Newberg; Albany College, at Albany; McMinnville College, at McMinnville; Reed Institute at Portland; Philomath University, at Philomath; Willamette College, at Salem, are among the many educational institutions. Capital, Salem. Much the largest city is Portland. Pop. (1900) 413,536; (1910) 672,765; (1920) 783,389.

Oregon City, county seat of Clackamas Co., Oregon, on Willamette River, 15 miles S. E. of Portland. It has paper and pulp mills, lumber works, etc. Water power is developed from the falls. Pop. (1920) 5686.

O'Reilly, JOHN BOYLE, poet, born in County Meath, Ireland, in 1844; died in 1890. Enlisting in the army for the purpose of spreading revolutionary doctrines among the soldiers, he was arrested, tried for treason, and exiled for 20 years to Australia. He escaped the following year (1869), sought the United States and became editor and chief owner of the Boston *Pilot*.

Orel (Russian pron. ar-yol), a central government of Russia, south of the Tula and Kaluga; area, 18,042 sq. miles. Livestock, particularly horses, are extensively reared from improved breeds. Manufactures are flour, iron, glass, etc. The principal rivers are the Oka, the Desna, and the Sosna. Orel, or Orlov, the capital, on the Oka, is an important business center, the river and canals giving it water communication with the Black Sea, the Caspian, and the Baltic. Its trade in grain, dairy produce, and cattle is large. Pop., govt., 2,816,200; town, 97,200.

Orellana (o-rel-yä'nä), FRANCISCO, a Spanish companion of Pizarro, the first of navigators to sail down the great Amazon River, which sometimes received his name.

Orelli (ō-rel'i), JOHN CASPAR, a distinguished Swiss philologist and critic, born at Zürich in 1787; died in 1849. In 1806 he was ordained to the pastorate of the Reformed Church at Bergamo in Italy. From 1813 to 1819 he held a professorship at the college of Coire, when he took the chair of eloquence and hermeneutics at the Carolinum, in Zürich. His reputation rests principally on his editions of the Greek and Roman classics (especially Horace), which have attained a well-merited celebrity.

Orenburg (å-ren-bŏrg'), a government of Eastern Russia, partly in Europe and partly in Asia, with an area of 73,254 sq. miles; pop. 2,272,000. A very large part of the surface consists of steppes, but the agricultural districts in the northwest supply large quantities of grain for export. The drainage is partly to the Arctic Ocean, partly to the Caspian, the chief rivers being the Tobol and the Ural. Gold abounds along the whole Ural chain, and there are also copper, iron and salt mines. The population consists chiefly of the Finnish Votiaks and Tepyaks, and the Tartar Bashkirs, a large section being Mohammedans. The capital, Orenburg, on a slope above the right bank of the Ural, has, besides vast tallow melting establishments, woolen, soap and leather factories, and a large caravan trade with Khiva and Bokhara. Pop. (1910) 93,000.

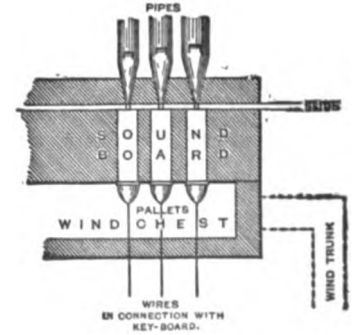
Orense (ō-ren'sā), a city of N. W. Spain, Galicia, capital of the province of same name, and see of a bishop, on the left bank of the Minho, here crossed by an old and remarkable bridge, built in 1230. It is a very ancient place, and has an interesting old Gothic cathedral and three warm springs (154° Fahr.). It has no commercial importance. Pop. 15,194.—The province has an area of 2739 sq. miles, and a pop. of 404,311. It raises a good deal of maize, and has mines of tin, copper and iron.

Orestes (ō-res'tez), in Greek mythology, the son of Agamemnon and of Clytemnestra, the avenger of his father, by becoming the murderer of his mother. For this murder he is relentlessly pursued by the Eumenides or Furies, and only succeeds in appeasing these terrible goddesses by carrying out the instructions of the Delphian oracle to bring back the statue of Diana from Tauris to Argos. Married to Hermione, daughter of Menelaus, Orestes ruled over his paternal kingdom of Mycenæ, and over Argos, upon the death of its king. Orestes is an important figure in the *Choëphori* and the *Eumenides* of Æschylus, the *Electra* of Sophocles, and the *Orestes* and *Iphigenia in Tauris* of Euripides.

Orfila (or-fī'la), MATTHEW JOSEPH BONAVENTURE, a Parisian physician and chemist, born in 1787, at Mahon, in the island of Minorca; died at Paris in 1853. After taking his degree of M.D. in Paris, he delivered lectures on botany, chemistry and anatomy, which, along with his medical practice, soon gave him a high reputation and a prominent position. Having been naturalized in France in 1818, he was next year appointed professor of medicine and toxicology at Paris, and in 1823 became professor of medical chemistry and medical jurisprudence. Louis XVIII appointed him his body physician, and Louis Philippe bestowed further honors on him. He wrote several important works on toxicology and medical jurisprudence; his *Leçons de Médecine Légale* and his *Traité de Toxicologie* were translated into most of the languages of Europe.

Orford, EARL OF. See *Walpole.*

Organ (ôr'gan; Greek *orgănon*, an instrument), a wind instrument of music, the grandest of musical instruments, the introduction of which into the church service has undoubtedly exercised a powerful influence on the development of musical art. It is stated to be of very ancient origin, but is most probably the offspring of the ***hydraulicon*** or ***water organ*** of the Greeks. The early organs were very imperfect instruments, but improvements were naturally made from time to time, the most notable being those of the sixteenth century, when the bellows were much improved and the division of all the pipes into different stops invented, and the tone of the instrument adapted to the choir. The invention of the *windchest* in the seventeenth century, by which an equal pressure of wind can be obtained from all the bellows, led chiefly to the present perfect state of the organ. The three essentials of an organ are: (1) a chest of compressed air; (2) a set of pipes producing musical sounds in communication with this chest; and (3) a keyboard or clavier, by means of which this communication may be opened or closed at pleasure. The air is forced into the windchest by means of bellows. To the upper part of each windchest is



Organ—Internal Arrangements.

attached a ***sound-board***, a contrivance for conveying the wind to any particular pipe or pipes at pleasure, and divided into as many grooves as there are keys. Air is admitted into these grooves by means of valves or pallets, which are connected with the keys; the transmission of air being regulated by the *register* or *slide*. The series of pipes above each slider is called a stop. The principal stops of an organ are the *open*, *stopped* and *double* diapasons; the *principal*, *dulciana*, *twelfth*, *fifteenth*, *flute*, *trumpet*, *clarion*, *bassoon*, *cremona*, *oboe* and *vox humana*. An organ may have several windchests filled by the same bellows, and several keyboards, each keyboard and windchest representing a distinct organ. In the largest instruments the number of these organs generally amounts to five; viz. the *great organ*, the *choir organ*, the *swell organ*, the *solo organ* and the *pedal or-*

gan. The keyboards for the hand are termed *manuals*, that for the feet the *pedal.* The most usual compass of the manuals is from CC to F in alt, four octaves and a half; that of the pedal from CCC to E or F, two and a quarter to two and a half octaves. There are two kinds of organ pipes—*flute* pipes or *mouth* pipes, and *reed* pipes, of each of which there are several species, the character and quality of their sound depending mainly on the material employed in their manufacture (wood or metal), their shape, and dimensions. A hydraulic engine has been adapted, with success, to the purposes of working the bellows, and it is now pretty generally adopted. In 1863 a contrivance was patented for transferring some of the work from mechanism to electro-magnetism. An organ built on this principle is termed an *electric organ.* The principal advantages of this description of organ are that it facilitates the playing, and enables the organist to sit at a keyboard at a distance from the instrument. A free reed instrument was introduced about 1860 by Mason and Hamlin, of New York, known as the *American organ*, differing from the harmonium in having smaller and more curved reeds and in drawing the air inwards. It is more easily blown than the harmonium, and its tones are of a more organ-like quality, but it is inferior to the latter instrument in variety of tone and power of expression. Within recent times many organs of great size and power have been constructed in various European and American cities.

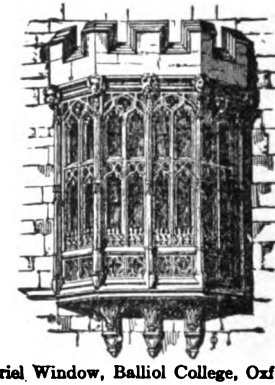
Organ, ORGANIZATION. In biology, the term *organ* is applied to all the definite parts with special functions, forming as a whole the structure of a living body, whether animal or vegetable. The dissimilarity between the organs of which a living being is composed forms a very striking contrast to the structure of lifeless bodies. A lifeless body—such as a mineral—exhibits generally a sameness or homogeneity of structure. Its intimate parts or particles are usually of a similar kind or nature. Hence this broad and patent distinction has resulted in the employment of the terms *organic* and *organized* to express the characteristics of living beings; while to the lifeless part of creation the opposing term *inorganic* is applied. *Organization* thus means the possession of definite organs, structures, or parts, which have definite relations to each other; and an *organism* is a whole, an animal or plant, possessing such organs.

Organic Radicals, in chemistry, the name given to a number of compounds of carbon which act in many bodies as if they were truly elementary substances.

Organotherapy (ôr-gan-ô-ther'a-pi), the treatment of disease by extracts made from various organs or glands of the sheep or other animals. Its essential feature is to imitate as closely as possible the internal secretions of the human glands, so that the organ may be naturally restored.

Orgies (ôr'jêz; Greek, *orgia*), anciently the mystic rites and wild revels celebrated in honor of Bacchus; also the festivals and mysteries of other Pagan deities. See *Bacchus* and *Mysteries.*

Oriel Window (ô'ri-el), a window projecting from the outer face of a wall, in plan semihexagonal, semioctagonal, or rectangular, thus having three or more sides, divided by mullions and transoms into different



Oriel Window, Balliol College, Oxford.

bays and other projections, and supported by brackets or corbels. A projecting window rising from the ground is sometimes called an oriel, but is more properly a bay-window.

Oriental (ô-ri-en'tal), eastern. The term is often applied to certain gems or precious stones as a mark of excellence, or to distinguish them from an inferior variety, in opposition to *occidental.*

Oriental Languages, the general designation at the present day for the languages of the nations of Asia, as also of the Mohammedan countries of Europe and Africa.

Orientation (ô-ri-en-tā'shun), a turning towards the east; the direction of something towards the

east. By ecclesiologists it is used in regard to the building of churches in a direction east and west, though often a deviation from the true east has been observed to exist in churches which had been supposed to stand for exactly east and west.

Oriflamme (or-i-flam), until Charles VII's reign, the royal standard of France, originally the banner of the abbey of St. Denis and its lord protector. When the French kings chose St. Denis as their patron saint, they made the oriflamme the principal banner of their armies. It was a piece of red taffeta fixed on a golden spear, in the form of a banner, and cut into three points, each of which was adorned with a tassel of green silk.

Origen (or'i-jen), ORIGINES, surnamed *Adamantios*, one of the greatest and most influential of the Greek fathers, born at Alexandria A.D. 185; died at Tyre 254. His father suffered martyrdom at Alexandria in 202 under the Emperor Severus, when Origen undertook the support of his mother and six children. He lectured with much success in Alexandria, and gained the patronage of Bishop Demetrius. His own studies were pursued with extraordinary zeal; he lived an ascetic life, and in order to be free from the lusts of the flesh he mutilated himself. A journey to Rome (211-212) greatly increased his reputation, and Christian communities in various countries vied with each other in securing his services. In 228 he went to Palestine; he was so well received, and so many favors were bestowed on him that his patron became jealous, recalled him to Alexandria, and finally deprived him of his priestly office, charged him with heresy, and expelled him from the city. These persecutions never ceased until the death of Demetrius in 231. In a new persecution, under the Emperor Decius, Origen, who was viewed as a pillar of the church, was thrown into prison, and subjected to the most cruel sufferings, ultimately resulting in his death. He has been reproached with having attempted to blend the Christian doctrines with the notions of Plato, and, without reason, of favoring materialism. He is credited with some 6000 works, including smaller tracts, but only a few have been transmitted to us, and some of these only in a distorted form. His work against Celsus is considered as the most complete and convincing defense of Christianity of which antiquity can boast. One of his works was the *Hexapla* (which see), but of it we have only fragments. A translation of his extant works into English has been published (Edinburgh, 1868-72).

Origenists (o r' i-jin-istz), Christian heretics in the fourth century, so called because they pretended to draw their opinions from the platonic notions in the writings of Origen. They first made their appearance in Italy in 397, with Rufinus of Aquileia as their teacher.

Original Sin (o-rij'in-al), in theology, the first sin of Adam, namely, the eating of the forbidden fruit; hence, either the imputation of Adam's sin to his posterity, or that corruption of nature and tendency to sin inherited from him. The Greek fathers held that a perverted will and sin are coördinate with the human race, and that death has dominion over it by reason of its origination from Adam after the fall. In the Latin Church the doctrine was more fully developed than in the Greek Church. Tertullian, in accordance with his doctrine of Traducianism, which holds that the soul as well as the body is generated by the parents, asserted that sin and death were alike propagated from Adam; he accordingly held an *originis vitium*, but without regarding it as actual sin or denying to man the possibility of goodness. Pelagius held that no change whatever had been brought about by the fall, that death was a part of man's original constitution, and that all men could render faultless obedience to the law of God, if they wished. Augustine succeeded in getting this doctrine condemned in favor of his own, which inculcated that 'Death was brought into the world by Adam's sin; man's free-will, the reflex of the divine will, was lost to him by the fall as regards good; there remained only spontaneity, the negation of outward constraint, and free-will as regards evil.' Pelagianism, however, sprung up again in a modified form, called semi-Pelagianism, and according to this view death and a taint of corruption were inherited from Adam as a disease might be, but man still retained a power for good without the aid of divine grace; a doctrine which obtained much support at the time. The reformers of the sixteenth century upheld the strictest view of original sin, though by no means unanimously, in opposition to the Roman Catholics, who at the Council of Trent gave their adhesion to the more liberal view of the doctrine. In recent times orthodox theologians, such as Olshausen, Hengstenberg and others, have stood up for the Augustinian doctrine, while those of the more liberal school have modified it in various ways. Philosophers as well as theologians have taken part in this controversy about original sin, it being a subject open to diverse opinions.

Origin of Species. See *Species.*

Orihuela (ō-rē-wā'lȧ), an ancient town of S. E. Spain, province Alicante, in a fertile plain on the Segura, 30 miles southwest of Alicante. It has a considerable trade in fruit, cereals, oil and wine. Pop. (1910) 35,072.

Orillia (ō-ril'li-ȧ), a town and summer resort on Lake Simcoe, Ontario, Canada, 86 miles N. of Toronto. Has various manufactures. Pop. 6828.

Orinoco (ō-ri-nō'ko), a river of South America, one of the largest in the world, rising in the Sierra del Parima, near lat. 3° 40′ N., long. 64° W., and after a circuitous course falling into the Atlantic opposite Trinidad; its principal mouth being 6 leagues wide; length about 1500 miles. The Orinoco is connected with the Rio Negro, a tributary of the Amazon, by the Cassiquiari, a natural canal joining the two rivers, and it receives the waters of many large rivers. During the rainy season it inundates the immense plains through which it flows, presenting to the eye a boundless expanse of waters. The scenery on its banks is magnificent beyond description. Two rapids occur in the upper part of the river; thence it is navigable to its mouths, which were declared open to international navigation October 29, 1900.

Oriole (ō'ri-ōl), a name popularly applied to two groups of birds, the one group included in the Conirostral section of the Insessores or perching birds, the other classified with the Dentirostral section. The American Orioles belonging to the former group are nearly allied to the starlings. The Baltimore bird (which see), oriole, or golden robin (*Ictĕrus* or *Hyphantes Baltimore*), is a familiar species of this group. Another, the orchard oriole (*Ictĕrus spurius*), is distributed very generally over the United States. The orioles proper, or those of the Old World, are nearly related to the thrushes. They are found in Asia, Africa, the islands of the Indian Archipelago, and Southern and Eastern Europe. The golden oriole (*Oriŏlus Galbŭla*) is the typical form, and the only European member of the group. The wings and tail of the males are black and contrast powerfully with the golden color of the body. In size it resembles a common thrush or blackbird. It chiefly inhabits Southern Europe, but is occasionally found in Britain. The song is loud, and resembles the sound of the flute.

Orion, (ō-rī'un), a hero of Greek mythology. According to Homer he was a beautiful youth, of whose charms Eōs (Aurora) became enamored. The gods were jealous of her love, and Artemis slew him with her arrows. According to other writers he was a great hunter of colossal stature, and died of the sting of a scorpion. The hero after his death was placed with his hounds in the heavens as a constellation, which bears his name.

Orion, a constellation situated in the southern hemisphere with respect to the ecliptic, but the equinoctial passes nearly across its middle. This constellation is represented by the figure of a man with a sword by his side. It contains seven stars, which are very conspicuous to the naked eye; four of these form a square, and the three others are situated in the middle of it in a straight line, forming what is called the *Belt of Orion*, and popularly the *Ell-wand* or *Yard-wand*. Orion also contains a remarkable nebula, and eighty stars according to the British catalogue, but there are thousands of others which are visible only through powerful telescopes.

Oriskany, BATTLE OF, one of the bloodiest battles of the American Revolution, fought about two miles west of Oriskany, N. Y., August 6, 1777, between about 800 American militia under General Herkimer (q. v.) and a like number of Indians and Tories under Sir John Johnson (q. v.) and Joseph Brant (q. v.). The Americans started to relieve Fort Stanwix which was besieged by St. Leger (q. v.), Brant and his Indians; they were halted in a ravine near Oriskany and a desperate battle ensued, lasting for several hours. Each side lost a third of its number, but the Americans remained masters of the field though badly crippled. General Herkimer was mortally wounded in the fight.

Oristano (or-ēs-tä'nō), a city of the island of Sardinia, on the west coast, the see of an archbishop. Pop. 7107.

Orizaba (ō-rē-sä'va), a town of Mexico, state of Vera Cruz, 65 miles W. S. W. of Vera Cruz. It lies in a fertile valley, 3975 feet above sea-level, and is a rapidly-improving trade center. Tobacco, grown nearby, is largely manufactured, also leather and woolen cloths. In its vicinity is the extinct volcano, the Pico de Orizaba, 17,665 feet high. Pop (1910) 35,263.

Orkney Islands (ork'nē) (the ancient *Orcădes*), a group lying off the northern coast of Scotland, and separated from it by a channel called the Pentland Firth, about 6 to 8 miles broad; aggregate area, 375 square miles. There are 67 islands and islets, 28 of which are inhabited. Pomona or Mainland is the largest of the group; others of considerable size are: Hoy, South and

North Ronaldshay, Westray, Sanday, Eday, Stronsay, Rousay and Shapinshay. The rocks belong to the Old Red Sandstone formation, and clay and peat-moss abound. The climate is moist but not cold. Agriculture, pasturing and fishing are the supports of the inhabitants, manufactures being restricted to hosiery. The chief town is Kirkwall. It is probable that the Picts originally possessed the islands, but in the eighth century and subsequently they were occupied by the Northmen. For several centuries they were ruled by jarls or earls, who sometimes owed allegiance to Norway, sometimes to Scotland. James III of Scotland received the islands as a dowry with Margaret of Norway in 1469, and ever since they have belonged to Scotland. Pop. 28,698..

Orlando (or-lan'dō), a city, county seat of Orange Co., Florida, 146 miles s. of Jacksonville, in the beautiful lake region. It is a winter and summer resort, and is in the center of a rich agricultural section; has cigar factories, foundries, planing mills, fertilizer factories, etc. Rollins College, on Lake Virginia, is 5 miles distant. Pop. 9282.

Orlando, VITTORIO EMANUELE, an Italian statesman, born at Palermo, 1860. In 1917, during the World war, he became Premier, holding office till June 19, 1919. He was Italy's spokesman at the Peace Conference in 1919.

Orlando Furioso. See *Ariosto.*

Orlando Innamorato. See *Boiardo.*

Orléanais (or-lā-â-nā), a former province of France, now forms the departments Loir-et-Cher and Loiret, and parts of Eure-et-Loir Nièvre, Seine-et-Oise, Sarthe, Indre-et-Loire and Cher.

Orléans (or-lā-ân), a city of France, formerly capital of Orléanais, now of the department of the Loiret, situated on the right bank of the Loire, 68 miles southwest of Paris. It has some handsome public squares, a Gothic cathedral, two hôtels-de-ville, a palais de justice, and other notable buildings. The manufactures and trade of the place have much declined; confectionery, pottery and woolen goods are the staple articles of manufacture. Philip of Valois erected Orléans into a duchy and peerage in favor of his son, and Orléans has since continued to give the title of duke to a prince of the blood-royal. In 1428 the city sustained a siege against the English, and was relieved by the Maid of Orléans (see *Joan of Arc*), whose statue in bronze stands in one of the public squares. It was taken and retaken more than once in the Franco-German war in the latter part of 1870. Pop. 57,544.

Orléans, a French royal family, two houses of which have occupied the throne of France. (1) On the death of Charles VIII without issue in 1498, Louis, duke of Orléans, great-grandson of their common ancestor Charles V, and grandson of the first Duke of Orleans, being the nearest heir, ascended the throne under the title of Louis XII. Henry III (died in 1589) was the last sovereign of this house, or the *Valois-Orléans* branch. (2) The house of *Bourbon-Orléans* is descended from Philip, duke of Orléans, son of Louis XIII and younger brother of Louis XIV. His son Philip, duke of Orléans, was regent of France during the minority of Louis XV. His grandson, Louis-Philippe Joseph, who assumed the surname of *Égalité*, was beheaded in 1793. (See article below). Louis Philippe, duke of Chartres, afterwards king of the French, was the son of *Egalité.* The grandson of Louis-Philippe, the Comte de Paris, born in 1838, and educated in England, was long the head of the royal house and royalist party of France. See *Bourbon* and *Paris, Comte de.*

Orléans, HENRI, Prince of, son of the Duke de Chartres, was born near Richmond, England, in 1867; died in 1901. Excluded from France by the law exiling all members of the old royal family, he became after 1887 an active traveler, traversed India, explored Thibet with Bouvalet, and traveled in Arabia, Madagascar, Tonkin and Abyssinia. He won high honor from the geographical societies of France and other countries for his explorations and discoveries. He wrote *Six Months in India, Tiger Shooting,* and, with Bouvalet, *From Paris to Tonkin, Across Unknown Thibet.*

Orléans, JEAN BAPTISTE GASTON, DUKE OF, third son of Henry IV of France, and Mary of Medici, born in 1608; died at Blois in 1660. His early education was miserable, and the cause of the feebleness of character which he displayed through life, although he had received from nature much more of his father's spirit than his brother Louis XIII. The latter was jealous of the duke, and opposed him in many ways, while the duke retaliated by intriguing against the king; and but for Richelieu, who was a greater power in the state than the royal family itself, might have succeeded. By his first marriage, with Mary of Bourbon, heiress of the house of Montpensier, he had a daughter, the author of some interesting memoirs. During the disturbances of the Fronde he joined De Retz, the soul of the Fronde, who, however, soon saw

through the character of his fickle and feeble confederate. After the termination of the troubles (1648) the duke was banished to Blois.

Orléans, LOUIS PHILIPPE JOSEPH, DUKE OF (*Egalité*), great-grandson of the regent, Philippe, duke of Orléans, was born in 1747; married in 1769 the daughter of the Duke of Penthièvre. He was notorious for his dissoluteness of manners, and the extreme, though vacillating political conduct by which he courted popularity. His opposition to the court began in 1771, and he became the rallying point of its enemies. In 1787 he was exiled for the part he took in the Assembly of Notables; in 1789 he was one of the nobles who joined the Tiers Etat (Third Estate); in 1792 he went over to the revolutionary party without reserve, took the name of *Philippe Egalité* ('Philip Equality'), and voted for the death of Louis XVI. It did not save him from being arrested as a Bourbon, condemned and beheaded, November 6, 1793.

Orléans, MAID OF. See *Joan of Arc.*

Orléans, PHILIPPE, DUKE OF, only brother of Louis XIV of France, and founder of the house of Bourbon-Orléans, which for a short time held the throne of France, was born in 1640; died in 1701. In his twenty-first year he married Henrietta of England, sister of Charles II. The great esteem which the king showed for this princess excited the jealousy of his brother, and her sudden death was attributed to poison, to the administration of which the duke was suspected of being accessory. His jealousy seems not to have been unfounded. The second marriage of the duke, with the Princess Elizabeth of the Palatinate (1671), was arranged by Louis to secure the neutrality of the Elector Palatine in the approaching war against Holland. In this war the duke distinguished himself in spite of his effeminacy.

Orléans, PHILIPPE, DUKE OF, Regent of France, son of Philippe, duke of Orléans (see preceding article), and the Princess Palatine Elizabeth, born in 1674; died in 1723. He fell early under the influence of the clever and unscrupulous Abbé (afterwards Cardinal) Dubois, who continued his confidant and adviser through life. He made his military début at the siege of Mons (1691), and in 1693 distinguished himself at Neerwinden, but only to arouse the jealousy of Louis XIV, his uncle, who compelled him to retire from the army. In 1692 he married Mdlle. de Blois, the legitimated daughter of Louis. In 1707 he was appointed to succeed the Duke of Berwick in Spain, and completed the subjugation of that country. He was recalled, however, being suspected of intriguing for the crown of Spain, and again forced into retirement. On the death of the king (September 1, 1715) he was appointed regent. On acceding to power the regent found the finances in extreme disorder, and endeavored to improve matters by retrenchment and peace; but his reckless introduction of a vast paper currency brought the nation to the verge of bankruptcy. He resigned the government to Louis XV on February 13, 1723.

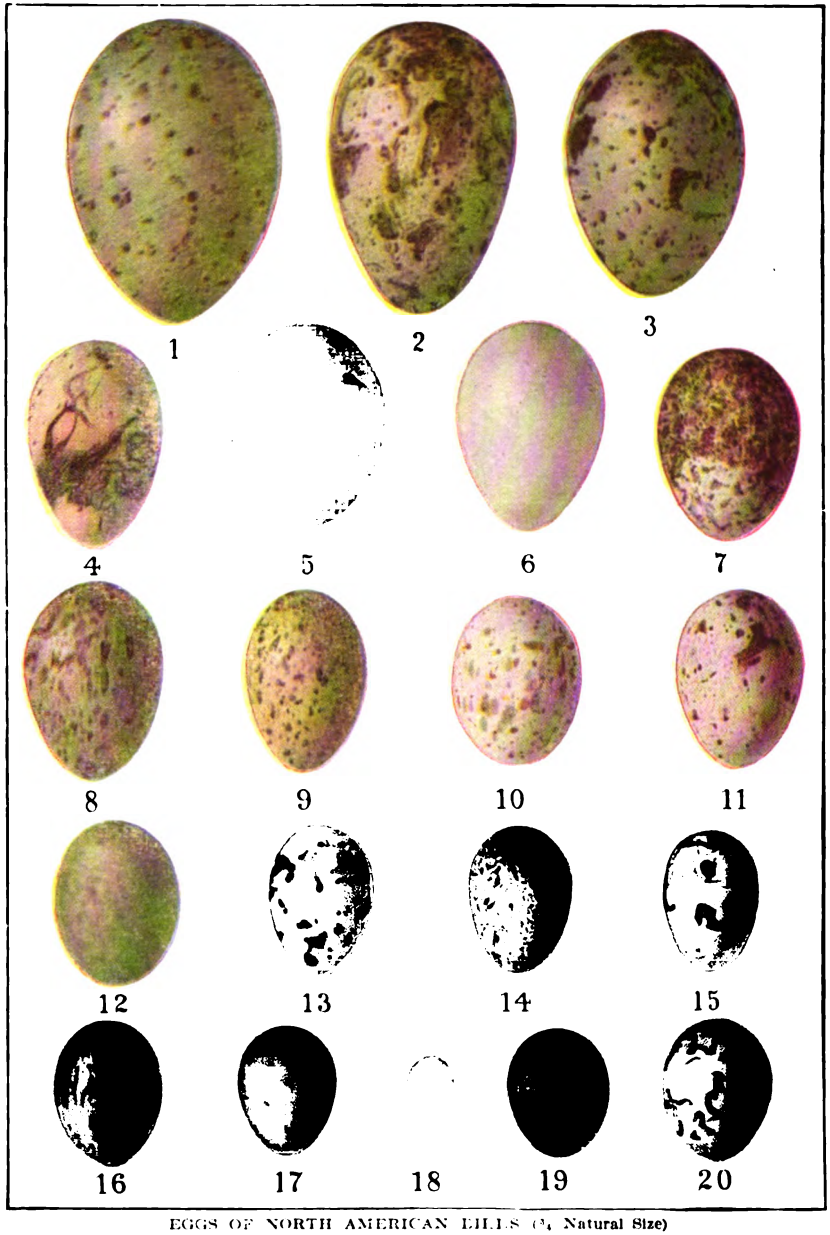
Orloff (or-lof'), a Russian noble family, of whom the following members may be mentioned:—GREGORY ORLOFF, born in 1734; died in 1783, assisted the Grand-princess Catharine in the revolution, by which she was declared empress (Catharine II), and her husband, the Emperor Peter III, deprived of life. Orloff soon attained the highest dignities and became enormously rich.—ALEXIS, his brother, born in 1737; died in 1808, is famous for his devotion to the empress, as one of the murderers of Peter III, and as the admiral who defeated the Turkish fleet off Tschesme.—ALEXIS FEDOROVITCH, prince, a descendant of the same family, born in 1787; died in 1861. In 1825 he gained the favor of Nicholas I by assisting to suppress the revolt of the guards on his accession. He held a cavalry command in the Turkish campaign of 1828, and assisted in suppressing the Polish insurrection in 1831; he also rendered successful diplomatic service, especially at Constantinople. In 1844 he was appointed chief of the gendarmes and secret police. He was the confidential friend of the emperor.

Orlop Deck (or'lop), the lowest deck in a ship of several decks, consisting of a platform laid over the beams in the hold whereon the cables are usually coiled. In trading, vessels it is often a temporary deck.

Ormer (or'mẽr; French *oreille de mer*, 'sea-ear'), the ear-shell, a large marine univalve shell-fish belonging to the genus *Haliótis*, common on the shores of the Channel Islands, where it is cooked after being well beaten to make it tender. The pearly interior of the shell has made it a favorite ornament.

Orme's Head, GREAT, a bold projecting headland in North Wales, at the mouth of the river Conway, surrounded on nearly all sides by the sea.

Ormolu (or'mō-lō; French, *or moulu*, literally 'ground gold') is in English frequently applied to a metal



EGGS OF NORTH AMERICAN BIRDS (¾ Natural Size)

1. Northern raven. 2. American raven. 3. American crow. 4. Great-tailed grackle. 5. Belted kingfisher. 6. Pileated woodpecker. 7. Nighthawk. 8. American magpie. 9. Blue jay. 10. Whip-poor-will. 11. Meadowlark. 12. Black-billed cuckoo. 13. Kingbird. 14. Cowbird. 15. Baltimore oriole. 16. Crested flycatcher. 17. Skylark. 18. Ruby-throated hummingbird. 19. Bobolink. 20. Red-winged blackbird.

compounded of copper and zinc (mosaic gold), nearly resembling brass, but having a color more like that of gold. In French *or moulu* signifies a paste of gold and mercury used for gilding, and the color imparted to a surface by that paste.

Ormonde, DUKE OF. See *Butler, James.*

Ormskirk (ôrmz'kirk), a town of England in Lancashire, 13 miles N. N. E. of Liverpool. Its chief occupations are brewing and rope-making. There are large collieries in the neighborhood. Pop. 7409.

Ormuz (ôr'muz), or HORMUZ, an island in the Persian Gulf, on the north side, near its entrance, about 15 miles in circumference. It is entirely destitute of vegetation and is only noticeable as having once been a great trade center. It was held by the Portuguese from 1515 to 1622. A few ruins are all that is left of its former wealth and splendor.

Ormuzd (ôr'muzd; *Ahuramazda*, the Oromasdes of the Greeks and Romans), the name of the supreme deity of the ancient Persians. According to the doctrine of Zoroaster he was the lord of the universe and the creator of earthly and spiritual life, the source of light, wisdom, and intellect, and the giver of all good. He rewards the good and punishes the wicked. See *Zoroaster.*

Orne (ôrn), a department in Normandy, France; area, 2354 square miles. It receives its name from the river Orne, which rises in this department, and passing through that of Calvados falls into the English Channel (length, 95 miles). The surface is traversed by a lofty ridge, mostly covered with forests. The soil is various; oats, flax, hemp, beet, fruits and cheese are the chief produce, and a good breed of Norman horses is reared. It manufactures needles, pins, wire, porcelain, cotton and linen cloths, and has valuable granite quarries. Alençon is the capital. Pop. 315,993.

Ornithodelphia (ôr-ni-thō-del'fi-a), the name given to the subclass of mammals represented by the single order Monotremata, including only two species, the ornithorhynchus and echidna.

Ornithology (ôr-ni-thol'ō-ji; Greek, *ornis, ornithos*, a bird, *logos*, discourse), that branch of zoölogy which treats of birds. Birds (Aves) form the second class of the great division of vertebrate animals, the connecting link between the Mammalia and Reptilia, but are more closely allied to the latter. In common with the Mammalia they have warm blood, though of a higher and uniform temperature (8°-12° higher), a heart with two auricles and two ventricles, and breathe by lungs; but differ from them in having feathers for a covering, two feet, wings, by which most of them are enabled to fly, a horny bill, and reproduction by eggs. The feathers, the development of which resembles essentially that of hair, constitute appendages of a unique kind, as being developed only in connection with the bird-class. The under plumage of most birds is formed by a thick coating of small shaftless feathers, embedded in the skin and called *down*. Various names are given to feathers according to their position; thus the long quills on the part of the wing corresponding to the hand are called *primaries*, those on the lower forearm *secondaries*, and those on the upper part of the forearm *tertiaries*, those on

PLUMAGE OF BIRD

Bohemian Chatterer (*Bombycilla garrula*).
a, primaries; *b*, secondaries; *c*, coverts; *d*, scapulars; *e*, tail feathers; *f*, forehead; *g*, sinciput; *h*, occiput.

the shoulder-blade and humerus *scapulars*. The feathers covering the bases of the wing quills are called *wing-coverts*, and those covering the *rectrices*, or great feathers of the tail, *tail-coverts*. Birds moult or renew their feathers periodically, and in many cases the winter plumage displays a different coloring from the summer plumage. The plumage in most cases is changed frequently before it attains its characteristic and full-grown state.

The mouth of birds takes the form of a beak or bill; the jaws or *mandibles* are hard and horny, and more or less prolonged into a point, while there are no fleshy lips and no teeth (except in certain fossil birds); a horny sheathing, generally smooth, but sometimes serrated, takes the place of the latter. The beak is variously modified in accordance with the habits of the bird and the nature of the food on which it subsists. The sense of taste is

not keen, their tongue being generally slender, pointed, and more or less horny, though some birds, as the parrots, have it fleshy. The nostrils open upon the side, or at the base of the beak. Their sense of smell is often very delicate. A circle of naked skin called the *cere* in many birds surrounds the base of the mandibles. The sight of birds is extremely keen, and equally adapted for near and for distant objects. A peculiar feature in the eye is the *nictitating membrane*, a sort of third translucent eyelid which rests in the inner angle of the eye, but can be drawn over it so as to protect it from too strong a light. Birds have no external ear, with the exception of the nocturnal tribes; these have a large exterior *conch* in the form of a thin leathery piece of flesh. The internal ear is very large, and the sense of hearing acute.

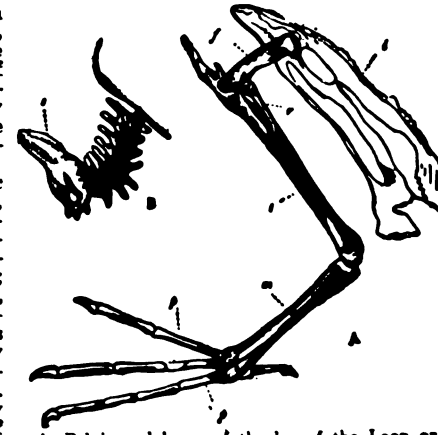
Skeleton of Egyptian Vulture (*Neophron percnopterus*), to show bones of bird.

a, post-orbital process; *b*, lower jaw; *c*, cervical vertebræ; *co*, coracoid bone; *d*, humerus; *e*, radius; *f*, ulna; *g*, metacarpus; *h*, second phalanx of chief digit of wing; *h*, phalanges of lower digit; *h''*, first phalanx of chief digit; *i*, clavicle; *k*, sternum; *l*, pelvis; *m*, coccyx; *n*, femur; *o*, tibia; *p*, tarso-metatarsus; *q*, phalanges of foot.

The bone tissue of birds is light and compact. The bones are whiter and contain a larger proportion of phosphate of lime than those of the Mammalia and lower vertebrates. The bones of most birds are *pneumatic*, that is, contain air instead of marrow, to adapt them for flight; the air being admitted by means of special apertures which are connected with certain sacs, termed *air cells*, filled with air from the lungs. In many birds, however, the long bones are filled with marrow, as are also all the bones of young birds. The humeri, cranial bones and sternum are most generally pneumatic, the femora more rarely so. The vertebræ vary considerably in number in different species. The neck is always more or less elongated and flexible, and consists of from 9 to 23 vertebræ. The dorsal region, or region of the back, is composed of from 4 to 9 vertebræ, and is generally firm, forming a support for the movements of the wings. In all birds the neck is of sufficient length to reach the *oil-gland* situated at the tail, the secretion of which is used for 'preening' or dressing the feathers. The vertebræ interposed between the dorsal vertebræ and those of the tail are united to form the sacrum, the number of vertebræ which may coalesce varying from 9 to 20. The caudal or tail vertebræ may number ten, the last two or more of which unite to form a bone, called from its shape, 'ploughshare' bone. In some species this bone is absent, undeveloped, or modified. The bones of the skull become firmly united at an early period, so as to leave few or no sutures or lines of union, as in mammals, a complete bony case being thus formed. The skull is joined, as in reptiles, to the spinal column and by a single process, or condyle, of the occipital bone, or hindermost bone of the skull. The chest or thorax is enclosed posteriorly by the dorsal vertebræ, laterally by the ribs, and in front by the sternum or breastbone and the sternal ribs. The ribs correspond in number with the dorsal vertebræ, from 6 to 9 pairs of ribs being thus found in birds, the first two being generally unattached, that is, they do not reach the sternum in front. The sternum is large and strong, and serves as the point of attachment for the most powerful of the muscles by which the wings are set in motion. It is provided with a medial crest or *keel*, which is most prominent in the birds of most powerful flight, and is altogether absent in the ostrich and cassowary, birds which do not fly. Upon the upper or anterior portion of the sternum the *coracoid bones* are borne, which form the chief supports of the fore limbs. At its upper portion each coracoid bone articulates with the scapula or shoulder-blade, and with one of the clavicles. The clavicles or collar bones are united in most birds to form the *furculum* or merry-thought. The bird exhibits the essential

skeletal elements found in the fore limb of all other vertebrates. The humerus, or bone of the upper arm, is generally short; the forearm, composed of the radius and ulna, being the longest segment of the fore limb. The ulna is larger and better developed than the radius, which is slender and attenuated. In the bones which form the extremity of the wing we recognize the rudiments of a thumb and two fingers, one of which has two phalanges and the other only one. The femur or thigh is short, the tibia or shin-bone forming the chief element in the leg; while the fibula is attenuated and generally ossified to the tibia. The toes generally number four; the hallux or great toe, when present, being composed of two phalanges, and the other toes of three, four and five phalanges respectively. The muscles of birds are firm and dense, and are generally colored deep red. The chief body muscles are the pectorals, or those of the breast, which are devoted to the movements of the wings.

There are three stomachs or stomachic dilatations in birds; the first is the *crop*, a considerable pouch attached to the *œsophagus* or *gullet*; then the *ventriculus succenturiatus*, a slight dilatation of the œsophagus, with thick and glandular walls; then immediately after this is the *gizzard*, a strong and muscular cavity. In granivorous birds the crop is large, and serves as a reservoir for the seeds swallowed by them, which are here moistened by a secretion before passing into the gizzard. In these birds the gizzard is extremely strong, having to perform the task of grinding down the hard substances subjected to its action, a process which is facilitated by the small stones which these birds generally swallow. The ventriculus secretes the gastric juice, and so far represents a real stomach. In birds which live on flesh or fish the gizzard is weaker and less distinct from the ventriculus; while the crop becomes smaller, and in some species completely disappears. The intestinal canal is relatively smaller than in Mammalia and presents fewer circumvolutions. It terminates in an opening called the *cloaca*, which is also the common termination of the ureters and oviduct. The liver is generally large, and colored a distinct brownish hue, which is deepest in aquatic birds. A gall bladder is absent in a few cases only, as in the ostrich, pigeons, and some parrots. The kidneys are two in number, of large size and elongated shape. The urine consists in greater part of earthy matters, and contains but a small proportion of water, hence its whitish appearance. The spleen is usually of small size, rounded or oval, but may also be elongated or broad and flattened. The heart is highly muscular, four-chambered; the blood, deep-red in color, circulates rapidly and vigorously. The lungs are confined to the back portion of the body, and are attached to the ribs, instead of being free, as in Mammalia. They are not divided into lobes, and are usually of a bright-red color. They are enveloped in a membrane pierced with large holes, which permit the air to pass into the cavities in the breast and in the abdomen, and, in some species, even into the interior of the bones. The



A, Pelvis and bones of the leg of the Loon or Diver (after Owen); *i*, Innominate bone; *f*, Thigh-bone (*femur*); *r*, Tibia; *r*, Fibula, together forming the shank; *m*, Tarso-metatarsus; *p* Phalanges of the toes. B, Tail of the Golden Eagle; *s*, Ploughshare-shaped bone, carrying the great tail-feathers.

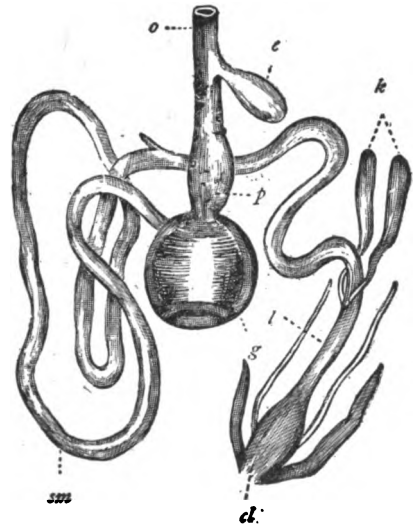
trachea or windpipe is of great relative length in birds, and is adapted to the length of the neck. The nervous system evinces a marked superiority over that of reptiles. The cerebrum, or true brain, is larger than in the latter, but its surface is not convoluted, as in most Mammalia. The generative organs consist of the essential organs or testes of the male, accompanied in some cases by an intromittent organ. The female organs consist of an ovarium and oviduct. The eggs are hatched by the process of *incubation*. Very great differences exist in the size, form and number of eggs which may be produced by birds, and in the time required for their hatching. The varieties of nests in which they are deposited, as to mode and materials used in construction, are endless.

Many birds migrate at certain seasons from one country to another, and a recent report on migration shows, that with very few exceptions there is scarcely a bird of either the palæarctic or nearctic regions that is not, to a greater or less degree, migratory in some part or other of its range. See *Migration*.

As for the classification of birds, many systems have been proposed. The chief older division is into seven orders, to which an eighth, the *Saururæ* of Huxley, is often added, to include the extinct archæopteryx. These orders are:—

Order I.—RAPTORES or *Accipitres*. Birds of Prey, as eagles, vultures, hawks and owls. Beak strong and curved, sharp at the edges. Feet adapted for seizing and destroying other animals. Claws sharp, much hooked and retractile. Hind toe on the same level with the others. Wings well developed.

Order II.—INSESSORES, *Passeres*, or Perching Birds, by far the most numerous order. It includes all the singing birds, and indeed, excluding the birds of prey, most birds which live habitually among trees. Feet formed for grasping and perching, claws moderately curved and not retractile. Hind toe on the same level as the rest. This order is usually divided into four *tribes* or suborders: *Conirostres* (cone-billed); *Dentirostres* (tooth-billed); *Tenuirostres* (Slender-billed); *Fissirostres* (cleft-billed).



Digestive system of the common Fowl (after Owen). *o*, Gullet; *c*, Crop: *p*, Proventriculus; *g*, Gizzard; *sm*, Small intestine; *k*, Intestinal cæca; *l*, Large intestine; *cl*, Cloaca.

Order III.—SCANSORES or *Zygodactyli*. Climbing Birds, as the parrots, woodpeckers, cuckoos, toucans, etc. Feet formed for climbing, two of the toes directed forward and two backward; powers of flight not in general great; bill variously shaped.

Order IV.—RASORES or *Gallinæ*. Domestic Fowls, Pheasants, Pigeons, etc. Legs large and strong. Feet with the hind toe situated above the heel, suited for scratching. Bill short, thick and arched above.

Order V.—CURSORES or *Struthionidæ*. Running Birds, as the ostrich, emu, cassowary, etc. Wings rudimentary and quite useless for flight; legs long and strong; hind toe wanting or merely rudimentary; breastbone without a ridge or keel.

Order VI.—GRALLATORES or *Grallæ*. Waders, as the cranes, herons, snipes, sandpipers, etc. Legs long, bare of feathers from above the knee; toes often half-webbed. Bill in general long and slender.

Order VII.—NATATORES or *Palmipedes*. Swimmers: web-footed birds, as ducks, geese, gulls, etc. Feet formed for swimming, in general webbed, that is, the toes connected by a membrane. Hind toe elevated above the plane of the others. Bill various, mostly flattened.

Mr. Sclater (partly following Huxley and others) has proposed a system of classification which has met with much acceptance, and is bared partly on external, partly on internal features. Regarding the class Aves as divided into two subclasses, *Carinātæ* and *Ratitæ*, the former containing all birds that have a prominent keel on the sternum (Lat. *carina*), the latter having the sternum flat and raft-like (Lat. *ratis*, a raft), he divides the former into twenty-three and the latter into three orders, thus:

CARINATÆ.—I. PASSERES, with four suborders (including more than half of all known birds, and substantially corresponding with the older order Passeres or Insessores). II. PICARIÆ, with six suborders (woodpeckers, swifts, goatsuckers, trogons, toucans, cuckoos, etc.). III. PSITACCI (parrots). IV. STRIGES (owls). V. ACCIPITRES (eagles, hawks, vultures, and other diurnal birds of prey). VI. STEGANOPODES (pelican, cormorant, gannet, etc). VII. HERODIONES (herons, storks, bittern, etc.). VIII. ODONTOGLOSSÆ (flamingoes). IX. PALAMEDEÆ (screamers). X. ANSERES (geese, ducks, swans). XI. COLUMBÆ (pigeons). XII. PTEROCLETES (sand-

grouse). XIII. GALLINÆ (fowls, partridges, pheasants, grouse, etc.). XIV. OPISTHOCOMI (includes only one bird, the Hoatzin). XV. HEMIPODII (Hemipodes, a small group). XVI. FULICARIÆ (rails, coots, etc.). XVII. ALECTORIDES (cranes, bustards, trumpeter). XVIII. LIMICOLÆ (snipe, woodcock, curlew, plover, etc.). XIX. GAVIÆ (gulls). XX. TUBINARES (petrels). XXI. PYGOPODES (divers, auks, grebes). XXII. IMPENNES (penguins). XXIII. CRYPTURI (tinamous). Subclass RATITÆ.—XXIV. APTERYGES (apteryx). XXV. CASUARII (cassowary and emeu). XXVI. STRUTHIONES (ostrich, rhea).

Birds are not numerous as fossil organisms. Among the most important and interesting bird fossils we at present possess are the two specimens of archæopteryx found in the slate quarries of Solenhofen (Bavaria). This bird differed from all existing birds in the elongated reptilian nature of its tail, which was composed of simple vertebræ, each bearing a single pair of quill feathers. It had also teeth. They certainly tend to prove the evolution of birds from reptiles. Other two most interesting fossil birds are the ichthyornis and the hesperornis, both found in the cretaceous formations of North America and both provided with teeth; but while the former must have had powerful wings the latter was quite wingless.

Ornithorhynchus (or-ni-tho-ring'kus; *Ornithorhynchus paradoxus*), the duck-billed water-mole of Australia. With the echidna or porcupine ant-eater of Australia it

Ornithorhynchus or Water-mole (*Ornithorhynchus paradoxus*).

forms the order Monotremata—the lowest division of the mammalian class. This curious animal was first described by Shaw in 1792, and caused no little excitement among zoölogists. It presents a quadruped, of the shape and size of a small otter, covered with short brown fur; a horny flat bill like a duck; a short flat tail; short legs with five-toed and webbed feet, terminated by claws. The eyes are small; external ear wholly wanting. The skull is bird-like in conformation; brain without convolutions; coracoid bones as in birds well developed. Its young are produced from eggs, are born blind and hairless, and suckled from milk-glands destitute of nipples. It forms large burrows in river and lake banks, rising from near the surface of the water to a height of perhaps twenty feet above it, the nest being at the higher end. It swims for its food, which consists of insects, worms, larvæ, etc.

Orobanchaceæ (or-o-ban-kā'si-ē), the broom-rape family of plants. Their general properties are astringency and bitterness. The calyx is divided, persistent, inferior; the corolla hypogynous, irregular, persistent, æstivation imbricated; stamens, four; ovary free, one-celled, with two carpels; style, one; stigma, two-lobed, divided transversely to the carpels; fruit capsular. The Orobanchaceæ are herbaceous parasites, with scales in place of leaves, and attach themselves to the roots of different plants, as the *Orobanche major* to broom and furze, *O. ramōsa* to hemp, *O. rubra* to thyme, *O. hedĕræ* to ivy.

Orobus (or'o-bus), a subgenus of the genus *Lathyrus* (which see).

Orography (or-og'ra-fi; Greek *oros*, a mountain), the description of mountains, their chains, branches, etc., or the mountain systems of a country collectively.

Oronoko. See *Orinoco*.

Or'onsay. (ō'ron-sā), small island of Scotland, on Loch Sunart.

Orontes (ō-ron'tēz), a river of Syria, rising on the east of the Anti-Libanus, and entering the Mediterranean; entire course about 200 miles. It is not navigable.

Oroshaza (ō-rōsh-hä'zo), a town of Hungary, about 30 miles northeast of Szegedin, in a cattle-raising and wine-growing district. Pop. 21,385.

Orosius (o-rō'si-us), a Latin historian, born in Spain about 390 A.D., became a Christian presbyter, resided a considerable time with St. Augustine at Hippo, and wrote at his suggestion a general history of the world (*Historiarum Libri vii. adversus Paganos*), to prove that the Christians were not to blame for the downfall of the Roman empire as the heathen alleged. It is a worthless compilation, but for long enjoyed a great popularity, and was trans

lated into Anglo-Saxon by King Alfred with modifications and additions.

Orotava (ō-rō-tä'va), a town and port of the Canary Islands, in the northwest of the island of Teneriffe. The town is about 3 miles from the port, and is a favorite summer residence of the rich Canarians. The port has a considerable trade. Pop. 9002.

Orphan Asylum, or ORPHANAGE (ôr'fan-ij), an establishment in which orphans are provided for and educated. In all well-regulated states the duty of taking care of destitute orphans was recognized at an early age, and it appears that the cities of Thebes, Athens, and Rome had establishments in which orphaned, deserted and illegitimate children were supported and educated at the public expense. In the laws of Emperor Justinian there is frequent mention of such institutions. In the middle ages such asylums were numerous and generally under the direction of the clergy. In recent times public orphanages have been substituted or supplemented by the farming-out system, that is, the children are brought up in private families willing to undertake their charge. This system, with due care in the selection of guardians and judicious supervision, has proved satisfactory wherever it has been tried. It is more economical, and the example of respectable family life cannot fail to have a beneficial moral influence. Orphan asylums, as conducted in the United States, are supported as private institutions, assisted by legislative appropriation. They are fostered also by the religious denominations. The most important among them is Girard College, Philadelphia, which is an orphan asylum on a grand scale and a power for good.

Orpheus (or'fûs), a personage of great importance in the mythology of Greece, surrounded by a multitude of legends, which invariably associate him with Apollo and the Muses. To him is attributed the application of music to the worship of the gods. Apollo presented him with his lyre, and the Muses instructed him to use it, so that he moved not the beasts only, but the woods and rocks with its melody. Having lost his wife Eurydice by the bite of a serpent he descended to Hades to try and get her back. His music so moved the infernal deities Pluto and Proserpine that they consented to her return to earth, only her husband, whom she was to follow, must not look back till they had reached the upper world. This condition the impatient Orpheus violated and lost his wife forever. He is said to have met his death at the hands of a band of furious women engaged in the mystic rites of Bacchus. He is represented as one of the Argonauts, and to him is ascribed the origin of the so-called Orphic mysteries connected with the worship of Bacchus. A considerable literature was connected with the name of Orpheus, the oldest portions of which were not earlier than 530 B.C. In part it yet exists, there being still extant a mythological poem called *Argonautica*, certain hymns, etc.

Orpiment (or'pi-ment), a mineral consisting of arsenic and sulphur, of a bright yellow color, passing into golden; specific gravity, 3.3-3.5. It occurs in laminated or lamellar masses, in concretions, and more rarely in minute crystals. It is also manufactured artificially.

Orrery (or'e-ri), an instrument for representing the motions of the planets, etc., a useful assistant to the teacher of elementary astronomy. It was so-called after the Earl of Orrery.

Orrery, CHARLES BOYLE, EARL OF, born in 1676; died in 1731. He was educated at Oxford, and succeeded his brother in the earldom (an Irish title) in 1708. For his services in connection with the Treaty of Utrecht he was created a British peer, as Lord Boyle. He published an edition of Phalaris, which gave rise to the controversy with Dr. Bentley. See *Bentley, Richard.*

Orris Root (or'is), or IRIS ROOT, the root of several species of *Iris*, especially of the *I. florentina*, which, on account of its violet-like smell is employed in perfumery and in the manufacture of tooth-powder. It is also used in pharmacy as a pectoral.

Orsini (or-sē'nē), one of the most illustrious and powerful families of Italy. It became known about the eleventh century, and had already acquired high rank and extensive possessions in the Papal States when one of its members, Giovanni Gaetano, was raised to the pontificate under the title of Nicholas III (1277-80). The feud between the Orsini and Colonna families is celebrated in history; it commenced towards the close of the thirteenth century, and is distinguished for bitterness, unscrupulousness and violence, assassination being not infrequently resorted to. Many of the Orsini became famous military chiefs. Vincenzo Marco Orsini (Benedict XIII) succeeded Innocent XIII as pope in 1724. (See *Benedict.*) The Orsini family is now divided into two branches, the Orsini-Gravina at Rome and the Orsini who reside at Piedmont.

Orsini, FELICE, an Italian revolutionist, born in 1819. In 1838 he was sent to study law at the University of Bologna, and joined the Society of Young Italy, formed in 1831 by Mazzini. In 1843 he took an active part in an insurrection, and being apprehended along with his father, also an ardent patriot, was sentenced to the galleys for life. By the amnesty of July 16, 1846, he obtained his freedom, but soon after he again engaged in intrigues under Mazzini, and took prominent part in the stirring events of the following years. In 1855 he was condemned to death, but the sentence was not carried out, and in 1856 he escaped to London. Here he wrote his work, *Austrian Dungeons in Italy* (1856), and lived by giving lectures on his adventures. He now planned the assassination of Napoleon III, as the main prop of reactionary tendencies in Europe, in concert with three Italian refugees, Rudio, Gomez and Pieri. The attempt was made on January 14, 1858, but was unsuccessful, and Pieri and Orsini were executed March 13, 1858, Gomez and Rudio being sentenced to imprisonment for life.

Orsk (ôrsk), a town of Russia, government of Orenburg, near the mouth of the Or, in the Ural. Pop. 14,036.

Orsova (or'sho-vâ), NEW ORSOVA, the name of two places near the Iron Gates of the Danube, the former a small town in Hungary, the latter a fortress in Servia, occupied by the Austrians.

Orsted, or ERSTED (eur'sted), HANS CHRISTIAN, a Danish physicist, born in 1777; died at Copenhagen in 1851. He studied at the University of Copenhagen, spent several years at the expense of government in Holland, Germany and Paris; was in 1806 appointed extraordinary professor of physics at Copenhagen; and in 1812-13, while on a second tour in Germany, he drew up his views of the chemical laws of nature, which he afterwards published in Paris under the title of *Recherches sur l'Identité des Forces Electriques et Chimiques.* His fame first became diffused over the scientific world in 1819 by the discovery of the fundamental principles of electromagnetism. In 1829 he became director of the Polytechnic School of Copenhagen, and on the occasion of his jubilee festival in 1850 he was created a privy-councilor.

Ortegal (or-tā-gāl'), CAPE, the northwestern point of Spain.

Orthez (or-tās), a town of France, department of Basses-Pyrénées, 24 miles northwest of Pau, on a hill above the Gave-de-Pau. Soult was here defeated by Wellington, February 27, 1814. Pop. (1906) 4159.

Orthite (ôr'thīt), a silicate of aluminium containing the rare metals cerium, lanthanum, didymium, and yttrium, occurring in granite and other rocks in Sweden, Greenland, the Ural, etc.

Orthoceras (ôr-thos'ėr-as), a genus of fossil cephalopods, having straight or slightly curved chambered shells, allied to the nautilus, and occurring from the Silurian to the Trias.

Orthoclase (orth'ō-klāz), called also the common or potash felspar, a silicate of aluminium and potassium found in fine monoclinic crystals disseminated in straight layers throughout the older rocks of many countries. The color varies from white to green; it is transparent or translucent; specific gravity, 2.4 to 2.6; hardness, 6.

Orthodox (ôr'thu-doks; Greek, *orthos,* right, and *doxa,* opinion), the opposite of *heterodox* (which see), generally applied to what is regarded as the established opinion, or that which is commonly considered as right. The term is chiefly used in religious controversies to designate certain religious faiths or doctrines.

Orthoepy (ôr-thō'e-pi), that branch of grammatical knowledge which deals with correct pronunciation.

Orthographic Projection, a term more specially applied to that spherical projection used by geographers in the construction of maps in which the eye is supposed to be at an infinite distance from the sphere, so that the rays of light coming from every point of the hemisphere may be considered as parallel to one another. This method of projection is best adapted for representing countries at a moderate distance from the center of projection. See *Projection.*

Orthography (ôr-thog'ra-fi), that part of grammar which treats of the nature and properties of letters, and their proper application in writing words, making one of the four main divisions or branches of grammar. The word is also used in architecture.

Orthopædia (ôr-thu-pē'di-a; Greek, *orthos,* straight, *paideia,* training), a branch of medical science relating to the cure of natural deformities. Hippocrates already occupied himself with the correction of deformed bones, but it was not until a comparatively recent epoch that this important subject met with the serious attention it

deserves. Several institutions for the cure of bodily malformations were founded in France and Germany in the early part of the nineteenth century. Orthopædia is divided into prophylactic or preventive, and therapeutic or curative. The object of the former is to prevent deformities in infants, and is obtained by hygienic means, such as pure air, careful nursing, and suitable food, clothing and exercise; that of the latter to correct deformities already existing by mechanical treatment, which is most successful when resorted to as soon as any deviation from natural shape manifests itself. In our time the manufacture of orthopædic apparatus has become highly developed, and forms an important branch of trade.

Orthoptera (ōr-thop'te-rȧ; Greek, *orthos*, straight, *pteron*, a wing), an order of insects of the subclass Hemimetabola, or insects in which the metamorphosis is incomplete. They have four wings, the anterior pair being semicoriaceous or leathery, usually with numerous nervures, the wings sometimes overlapping and sometimes meeting like the roof of a house. The feelers are generally straight, filiform organs. The limbs vary in conformation according to their methods of movement. In their metamorphosis the larvæ and pupæ are both active, and the pupa generally resembles the perfect insect, the wings being undeveloped. These insects are divided into Running (Cursorial) and Leaping (Saltatorial) Orthoptera. Of the former division the Cockroaches, Earwigs, Mantis Insects, Walking-stick Insects, and Walking Leaves form the chief families. The Saltatoria are represented by the Locusts, some of which want wings entirely, Crickets and Grasshoppers. See also *Entomology*.

Ortler-Spitze, or ORTLER (ōrt'lêr), a mountain of the Alps, in Tyrol, near the borders of Switzerland and Italy, the highest of the Austrian and German Alps; height, 12,814 feet. The group to which this mountain belongs is known as the Ortler Alps.

Ortolan (or'tu-lan; *Emberiza hortulāna*), a bird of the bunting family, a native of Northern Africa and Southern Europe. The colors are yellow on the throat and around the eyes, the breast and belly being of reddish hue, while the upper part of the body is brown varied with black. Its delicate flesh is much esteemed by epicures, and large quantities are annually caught and fattened for the table in the south of France, Italy and Cyprus.

Orton (ōr'ton), EDWARD, geologist, born at Delhi, New York, in 1829; died in 1899. He was professor of natural science in the New York Normal School at Albany 1856-59, at Antioch College 1865-69, president of Antioch College 1872-73, president of the Ohio State University 1873-81, and in 1881 became state geologist of Ohio and professor of geology in the university. He wrote several volumes on the *Geology of Ohio*. He was president of the Geological Society of America in 1897 and of the Association for the Advancement of Science 1898-99.

Orton, JAMES, scientist, born at Seneca Falls, New York, in 1840. He made two exploring expeditions to South America and in 1869 was made professor of natural history in Vassar College. He wrote *The Andes and the Amazon, Underground Treasures, Comparative Zoölogy, The Liberal Education of Women, Proverbialist and Poet*, etc.

Ortona (or-tō'na), a town and seaport of Southern Italy, province Chieti, on the Adriatic, 11 miles east of Chieti. It has a cathedral and several other churches and convents. Pop. 8067.

Ortyx (ōr'tiks), an American genus of gallinaceous birds allied to the quails and partridges. See *Quail*.

Oru'ba. See *Aruba*.

Oruro (ō-rō'rō), a town of Bolivia, capital of a department of the same name, on a bleak hill in a metalliferous district, at an absolute height of 13,000 feet. It has lost its former importance, and the population, once exceeding 40,000 is now 16,070. The department has an area of 19,000 square miles and a pop. of 86,081.

Orvieto (or-vē-ā'tō), an old town of Italy, province of Perugia, picturesquely situated on an isolated hill near the confluence of the Paglia and the Chiana, 60 miles N. N. W. of Rome. It is celebrated for its cathedral, built of black and white marble, and adorned with fine sculptures, mosaics and paintings, a beautiful specimen of thirteenth century Italian Gothic. Pop. 8820.

Orycteropus (or-ik-tēr'o-pus), the generic name of the aardvark, Cape pig, or ground-hog (*O. Capensis*) of South Africa, an edentate, insectivorous animal. See *Aardvark*.

Oryx (or'iks), the name of the genus of antelopes represented by the addax (*Oryx nasomaculata*) and by other species, found in large herds chiefly in the northern portions of the African continent. The horns are very long, spiral, and curved backwards. The gemsbok

(*Oryx Gazella*) of Southern Africa is another species included in this genus.

Osage (ō'sāj), a river in the United States, which rises in Kansas, flows through Missouri, and after a winding course of 500 miles joins the Missouri 10 miles below Jefferson City. The river gave name to an Indian tribe, the remnant of which now inhabit the Indian Territory.

Osage Orange (*Maclūra aurantiāca*), a tree of the nat. order Moraceæ (mulberry), indigenous to North America, where it is frequently used as a hedge-plant. It produces a large yellow fruit of a woody texture, somewhat resembling an orange, but not edible.

Osaka (ō'zä-kä), or OHOSA'KA, the second city and a free port of Japan, in the island of Hondo, on the estuary of the Yodo Gawa, 28 miles S. S. W. of Kioto. It is intersected by canals, which are spanned by numerous wooden bridges. The banks of the main channel are lined for 2 or 3 miles with the residences of the nobles, and it has a strong citadel. A railway connects it with Yeddo. The greater part of its foreign trade is carried on at Hiogo. It has arsenals, machine shops, steel and glass works, cotton and woolen mills, boot and shoe and match factories, etc. It is sometimes called the 'Venice of Japan,' there being more than 1200 bridges, while the population lives chiefly on the water. It has over 1900 places of worship, and takes a leading part in social affairs. Pop. (1911) 1,226,590.

Oscans (os'kanz; L. *Osci*; Greek, *Opikoi*), an Italian people who appear to have been the occupants, at the earliest known period, of Central Italy. The Oscans were subdued by the Sabines or Sabellians. Their language was closely allied to the Latin. Some wall-inscriptions in it have been found in Pompeii. There are no remains of it except in coins and inscriptions.

Oscar I (os'kar), JOSEPH FRANÇOIS BERNADOTTE, King of Sweden and Norway, son of Bernadotte (Charles XIV), born at Paris in 1799; died in 1859. In 1823 he married Joséphine, eldest daughter of Prince Eugéne Beauharnais. During the reign of his father he was three times (in 1824, 1828 and 1833) viceroy of Norway, where he made himself popular by his good administration. He acceded to the throne in 1844; reformed the civil and military administration of the state; abolished primogeniture; established complete liberty of conscience; encouraged education and agriculture; promoted railways, telegraphs, etc. He took little part in foreign politics. He resigned in favor of his eldest son in 1857.

Oscar II, King of Sweden and Norway, born in 1829; succeeded his brother, Charles XV, in 1872. He was a writer of some merit; translated Goethe's *Faust* into Swedish, wrote a *Life of Charles XII*, and published a volume of poems under the pen name of Oscar Frederik. During his reign Norway seceded from Sweden and established a separate kingdom. He died in 1907, and was succeeded by his son Gustavus V.

Osceola (os-se-ō'la), a Seminole Indian chief, born in Florida about 1813. His wife being claimed and carried off as a slave in 1835, he declared war against the whites and fought with them for two years with varying success. He was finally taken prisoner by treachery and confined in Fort Moultrie, where he died in 1837.

Oschatz (ō'shâts), a town of Saxony, about 30 miles to the east of Leipzig, with manufactures of woolens, leather, etc. Pop. 10,854.

Oschersleben (ōsh-ĕrs-lā'ben), a town of Prussian Saxony, on the Bode, 19 miles S. W. of Magdeburg. It has sugar and agricultural machine works, etc. Pop. 13,271.

Oscillation (os-i-lā'shun), the act of swinging to and fro. The term is often indiscriminately applied to all sorts of forward and backward motions, but it has special reference to the movements of the pendulum, which are subject to well-established laws.

Osel (ō'zel), an island in the Baltic Sea, forming part of Esthonia. It lies across the entrance of the Gulf of Riga and has an area of 1010 sq. miles. Agriculture, horse-breeding and fishing are the principal occupations. Chief town, Arensburg. Pop. 66,000.

Oshawa (osh'a-wä), a manufacturing town of Ontario, Canada, on Lake Ontario and Canadian Pacific and Canadian National railways, 34 miles E. of Toronto. Motors, tractors, rubber, textiles, pianos, iron and steel products are among the manufactures. Pop. (1911) 7436; (1921) 11,940.

Oshkosh (osh'kosh), a city of Wisconsin, county seat of Winnebago County, situated on Lake Winnebago at the mouth of Fox River, 49 miles S. S. W. of Green Bay. By means of the Fox River, there is direct steamboat connection with Lake Michigan at Green Bay. It has large manufactories of sashes, doors and blinds, a match factory, and a considerable variety of other indus-

tries, including textiles and metal working, in which there has been a rapid development. It has a State normal school. Pop. (1910) 33,062; (1920) 33,162.

Osiander (o-zi-an'dėr), ANDREAS, a German theologian, zealous reformer, and follower of Luther, born in 1498; died in 1552. He was present at the Diet of Augsburg in 1530, and his refusal to consent to the Augsburg interim in 1548 cost him his situation as preacher at Nürnberg, but soon after he was appointed professor of theology in the newly-erected University of Königsberg. Afterwards he was appointed vice-president of the bishopric of Samländ. In 1549 he became involved in a theological dispute, in which he maintained that justification is not a judicial or forensic act in God, but contained something of a subjective nature, as the imparting of an internal righteousness, brought about in a mystical manner by the union of Christ with men. One of his principal opponents was Martin Chemnitz. Although his views were condemned by several authorities he maintained them until his death. In 1556 all the Osiandrists were deposed, and Osiandrism forever banished out of Prussia.

Osier. See *Willow.*

Osiris (o-sī'ris), one of the great Egyptian divinities. He was the brother and husband of Isis, and the father of Horus. He is styled the Manifestor of Good, Lord of Lords, King of the Gods, etc. In the Egyptian theogony he represented the sum of beneficent agencies, as Set of evil agencies. Osiris, after having established good laws and institutions throughout Egypt, fell a prey to the intrigues of his brother Set, the Typhon of the Greeks. He became afterwards the judge of the dead. There are a multitude of traditions, both Greek and Egyptian, about Osiris. He is represented under many different forms, and compared sometimes to the sun and sometimes to the Nile. His soul was supposed to animate the sacred bull Apis, and thus to be continually present among men. His worship extended over Asia Minor, Greece and Rome. According to Herodotus the festival of Osiris was celebrated in almost the same manner as that of Dionysus. The worship of Osiris was probably introduced into Egypt, in common with the arts and sciences, from the Ethiopian Meroe. He is said by some authorities to have led a colony from Ethiopia into Egypt. Osiris was venerated under the form of the sacred bulls Apis and Mnevis; and as it is usual in the Egyptian symbolical language to represent their deities with human forms and with the heads of animals which were their representatives, we find statues of Osiris represented with the horns of a bull. Osiris, being with Isis the master of the world below, is often represented on rolls of papyrus as sitting in judgment on departed spirits. His usual attributes are a flowing cap, a flail or whip and a crozier. The rise of Christianity put an end to the worship of Osiris.

Osiris.

Oskaloosa (os-kȧ-lö'sȧ), a city and the capital of Mahaska county, Iowa, in one of the best coal regions of the West. It lies on the watershed between the Des Moines and South Skunk rivers, 62 miles S. E. of Des Moines. It contains Penn College, Central Holiness University, Oskaloosa College, and has bridge works and foundries, steam heater, brick and tile, clothing, and other factories. Pop. 9466.

Osmanieh (os-man'i-e), a Turkish order established by Abdul Aziz in 1861 for the reward of services rendered to the state. The chief decoration is a golden six-pointed star enameled in green.

Osler (ōs'ler), SIR EDMUND BOYD, a Canadian legislator and financier (1845-), born in Simcoe county, Ontario; educated at the grammar school, Dundas, Ontario. He began business in the Bank of Upper Canada, Toronto, and later became head of the financial firm of Osler & Hammond, of Toronto. He was president of the Toronto Bond Trade in 1896, and was appointed as representative of Canada at the Congress of Chambers of Commerce held in London in 1896. Recognized as an authority in finance, he became president of the Dominion Bank of Canada, and member of the Executive Committee of the Canadian Pacific Railway Company, as well as a director of that company. He was elected a member of the Dominion House of Commons for West Toronto in 1896.

Osler, SIR WILLIAM, brother of Sir Edmund, a Canadian physician and author (1849-1919), born at Bond Head, Ontario, educated at Trinity College, Toronto; Toronto University; McGill University, Montreal; University

College, London. He also studied at Berlin and Vienna, and was awarded an honorary D.Sc. from Oxford and Cambridge universities; Yale, Harvard and other universities conferring upon him the degree of LL.D. From 1874 to 1884 he was professor of the Institutes of Medicine at McGill University. In the latter year he became professor of clinical medicine at the University of Pennsylvania, remaining there till 1889, when he went to Johns Hopkins University as professor of the principles and practice of medicine, becoming chief physician of the Johns Hopkins Hospital. He went to England as regius professor of medicine at Oxford, devoting himself subsequently to lecturing and writing. In one of his popular lectures he declared that men over forty years of age were comparatively useless, and this statement was taken up and given wide publicity, often in distorted form, some quoting him as saying that men over sixty should be chloroformed. What he said was: 'We have to admit the comparative uselessness of men over forty years of age. . . . When a man neither wax nor honey can bring home, he should, in the interests of the institution, be dissolved from the hive to give more laborers room. . . . The men who are doing the work of the world are men between the ages of twenty-five and forty. . . . Take the sum of human achievement, in action, in science, in art, in literature; subtract the work of the men above forty—we should practically be where we are to-day.' Among his publications are *Cerebral Palsies of Children*, *Chorea and Choreiform Affections*, *The Principles and Practice of Medicine*, *Science and Immortality*, *Counsels and Ideals*, *Thomas Lanacre*, *An Alabama Student*, and other scientific and biographical works. He died December 29, 1919.

Osman Digna (os-män' dig'na), a general in the Mahdi's army in the Soudan (1836-1900), born at Suakin. He was in the slave trade when the revolt of Arabi Pasha (q. v.) broke out in 1881. Suffering severe financial losses when the English put a stop to his traffic in slaves, he joined Arabi in the attempt to drive the Europeans out of Egypt. The revolt was ended by the British success at Tel-el-Kebir, and Osman Digna joined forces with the Mahdi (Mohammed Ahmed), who appointed him emir of East Soudan. His knowledge of military tactics was of great value to the Mahdi, and, raising a powerful army, he successfully invested Tokar, near Suakin, and routed the forces there. He was said to have been largely responsible for the fate of General Gordon (q. v.) at Khartoum in 1885. In January, 1900, he was defeated at Tokar, and died soon afterward.

Osman Nuri Pasha (nō-re pash-a'), called GHAZI, 'the Victorious' (1832-1900), a Turkish field marshal, born at Tokat, Asia Minor. He entered the Turkish army in 1853 and fought in the Russian war of 1853-56 in Wallachia and the Crimea. Winning distinction in the Syrian rebellion, and particularly in the Cretan campaign, 1867-69, he was promoted to lieutenant-colonel. He became a brigadier-general in 1874 and on the declaration of war by Servia in 1876, he was given command of an army corps at Widdin, where he won fame and was promoted to the rank of *mushir* (marshal). His greatest achievement was his gallant and protracted defense of Plevna during the Russo-Turkish war (1877). On three occasions he repulsed great attacks by the Russians, on July 20th and 30th and September 11th, inflicting losses of upwards of 30,000 men on the Russians and their Roumanian allies. On December 9th he was captured by the Russians, but returned to Turkey after the treaty of San Stefano (see *Ottoman Empire*) in 1878. He was grand marshal of the palace till his death, which occurred on April 14, 1900.

Osmelite (os'me-lit), called also *pectolite*, a white or grayish-white mineral which occurs in many localities in acicular monoclinic crystals, consisting of hydrated silicate of calcium and sodium.

Osmium (os'mi-um; symbol Os, atomic weight 199), one of the platinum metals, forming a bluish-white lustrous mass, having a specific gravity of 22.48, being thus the heaviest of all bodies. It may also be obtained in crystals, or as a black amorphous powder, which is very combustible. Osmium is the most infusible of all the metals. It combines with chlorine in different proportions, also with sulphur, and forms alloys with some other metals. Osmic acid acts as a powerful oxidizer, decarbonizing indigo, separating iodine from potassium iodide, converting alcohol into acetic acid, etc.

Osmosis (os-mō'sis), Os'MOSE, the tendency of fluids to pass through porous partitions and mix or become diffused through each other. It includes *endosmose*, or the tendency of a fluid to pass inwards into another through such a partition, and *exosmose*, or the tendency of a fluid outward. When two saline solutions, differing in strength and composition, are separated by a bladder, parchment paper, or porous earthenware, they mutually pass through and

mix with each other; but they pass with unequal rapidities, so that, after a time, the height of the liquid on each side is different. Of all vegetable substances sugar has the greatest power of endosmose, and of animal substances albumen has the greatest. Graham showed that osmose was due to the chemical action of the fluids on the septum. In fact, the corrosion of the septum seems necessary for the existence of osmose. See also *Diffusion*.

Osmunda (os-mun'da), a genus of ferns, of the section Osmundaceæ, with free capsules opening by a longitudinal slit into two valves, no elastic ring, or instead of one a striated cup. The *Osmunda regālis*, the flowering or royal fern, which grows to the height sometimes of 10 feet, is a native of various parts of the Old World as well as of North America. It is often cultivated as an ornamental plant on account of its elegant appearance, the fructification forming a fine panicle somewhat resembling that of a flowering plant.

Osnabrück (ōs-na-brük'), or OSNABURG, an ancient town of Prussia, in Hanover, on the Hase, and 71 miles west of Hanover. In the old town it possesses many interesting buildings in Gothic and Renaissance style. It was formerly an important seat of linen manufacture, and gave the name to the kind of coarse linen known as osnaburg. Its chief manufactures are now chemicals, iron and steel, paper, cotton and tobacco. It is the see of a bishop, and the seat of several courts and public offices. Pop. 66,000.

Osprey (os'prā; *Pandion Haliaëtus*), a well-known raptorial bird, called also *fishing-hawk*, *fishing-eagle* and *sea-eagle*. It occurs both in the Old and New World, near the shores of the sea, or great rivers and lakes, and builds its nest in high trees and cliffs. It lives on fish, and pounces with great rapidity on its prey, as it happens to come near the surface of the water, the toes being armed with strong curved nails. The general body-color is a rich brown, the tail being banded with light and dark (in the old birds the tail is pure white), head and neck whitish on their upper portions, and a brown stripe extends from the bill down each side of the neck; under parts of the body whitish, legs of a bluish tint. In length the osprey averages about 2 feet, the wings measuring over 4 feet from tip to tip. The female lays three or four eggs. The American bald-eagle (*Haliaëtus leucocephălus*) pursues the osprey, who drops his prey with the view of escaping, when the eagle immediately pounces after the descending fish, and seizes it before it has time to touch the water.

Ossa (os'sa), a mountain of Northern Greece, in Thessaly, separated by the Vale of Tempe from Mount Olympus; height, 6348 feet.

Osprey (*Pandion Haliaëtus*).

Ossetes (os-sēts'), one of the numerous tribes or peoples inhabiting the Caucasus, belonging to the Indo-European or Aryan family, and to the Iranic branch of it. They are at a lower stage of civilization than some of the neighboring peoples. Their religion consists of a strange mixture of Christianity, Mohammedanism and Paganism. They number about 110,000.

Ossett (os'set; with Gawthorpe), a town of England, W. Riding of Yorkshire, 3 miles from Wakefield, with woolen mills, etc. Pop. 14,081.

Ossian (osh'i-an), a personage of ancient Scottish or rather Irish history, to whom are attributed certain poems, the subject of a great literary controversy of the latter half of the eighteenth century and the commencement of the nineteenth. It originated by the publication of two epics, *Fingal* (1762) and *Temora* (1763) by James Macpherson. (See *Macpherson, James.*) Both are a record of the deeds of a great Celtic hero, Fingal. In the first of these poems he is assumed to war with the Danes, leading to their ultimate expulsion; but in *Temora* he is placed farther back, and his struggles are with the Romans. These and some minor poems Macpherson attributed to Ossian, the son of Fingal, and alleged that his version was a literal translation of works which had been transmitted orally in the Gaelic language from bard to bard until the introduction of writing permitted them to

be committed to manuscript. Immediately on the publication of *Fingal* it attained an immense popularity. It was translated within a year into all the principal languages of Europe, and numbered among its admirers the ripest scholars and the most distinguished men of genius of the age. The question of authenticity which was raised immediately on the publication of *Fingal* was noticed with somewhat lofty disdain by Macpherson in his preface to *Temora*, and although he then professed to be able to meet it by the production of the originals, he generally maintained throughout the controversy an angry silence. At first the authority of Dr. Blair, who wrote an elaborate critical dissertation in favor of the authenticity of the poems, was regarded as of paramount authority throughout Europe; and notwithstanding the emphatic denunciation of Dr. Johnson, and objections of other critics, the believers in the genuineness of *Ossian* continued to hold their ground until Malcolm Laing's unsparing criticism, first in the introduction to his *History of Scotland* (1800), and afterwards in an annotated edition of the poems themselves 1805), gave a death blow to the position of those who maintained the integrity of the Ossianic epics. In 1797 the Highland Society issued a committee to inquire into the authenticity of the poems. The report published in 1805 states that the committee had not been able to obtain any one poem the same in title and tenor with the poems published by Macpherson; that it was inclined to believe that he frequently supplied chasms, and gave connection by inserting passages which he did not find, and added what he conceived to be dignity and delicacy to the original, by striking out passages, by softening incidents, by refining the language, etc., but that it was impossible to determine to what degree he exercised these liberties. In 1807, after the death of Macpherson and in accordance with his will, appeared the Gaelic originals of his poems, with a Latin translation, and accompanied by a new dissertation on their authenticity by Sir John Sinclair. Hence arose a new and singular controversy. It was asserted that these originals, the MSS. of which were all in the handwriting of Macpherson, were translated by himself from the English, and this charge seems to be about as well substantiated as that of the original fabrication. What appears really to have been decided, is that Ossian was a real or mythical Irish bard of the second or third century, of whom there are probably no authentic remains, although some brief poems, which cannot be traced further back than the eleventh century, are attributed to him. There are numerous traditions regarding him both in Scotland and Ireland. That Macpherson possessed considerable, and often conflicting material, collected in the Highlands, which he worked up into a continuous whole, in epic form, and that he himself produced the connecting links, seems beyond doubt.

Ossification (os-si-fi-kā'shun), the process of bone formation, which in all cases consists of the deposition of earthy or calcareous matter. It may take place by the deposition of osseous material in fibrous membranes, and thus the flat bones of the skull are developed; or by deposition in *cartilage*, as in the case of the long bones of the skeleton. The process of ossification in cartilage begins at various well-marked points called *centers of ossification*, where proliferation of cartilage cells and a deposit of lime salts occurs. (See also *Bone*.) Most organs of the body may become the seat of abnormal ossification. Deposits of limy matter take place frequently within the coats of arteries, making them easily ruptured; but this process is rather one of *calcification*.

Ossining (os'in-ing), a city of New York, in Westchester County, on the Hudson, 32 miles N. of New York city. It has large stove foundries, a large shoe factory, metal ware works, underwear factory, and various other industries. It was formerly called Sing Sing, and near by is the Sing Sing State Prison. Pop. (1920) 10,739.

Ossoli (os'so-lē), MARGARET SARAH FULLER, an American authoress, born in 1810; remarkable for her precocious and linguistic attainments. She became associated with Emerson and other eminent literary men. In 1840 she started and edited the *Dial* (a social philosophical magazine), and in 1844 became a writer to the *New York Tribune*. She visited Europe in 1846, married in 1847 the Marchese Ossoli; was in Rome during the siege of 1849, when she acted as superintendent of a hospital for the wounded, and embarked with her husband for New York, but they were wrecked, and both perished off Long Island, July 16, 1850. She wrote several works (besides translations), including *Women in the Nineteenth Century*, etc.

Ostade (os-tā'de), ADRIAN VAN, a painter of the Flemish school, and a pupil of Francis Hals, born at Lübeck in 1610; died at Amsterdam in 1685. The coarse enjoyments of Dutch peasants

formed the favorite subjects of his paintings, and the truth and animation he succeeded in throwing into his figures secured him a well-merited reputation. His brother, ISAAC VAN OSTADE, born in 1621; died in 1649; first imituted him, but was more successful in a style of his own. He was often solicited by landscape painters to add figures to their pictures.

Ostashkov (ŏs-täsh'kŏf), a town of Russia, government of Tver, on Lake Seliger, 195 miles N. W. of Moscow. It is a boat-building center. Among the other industries are the manufacture of agricultural implements and boots and shoes. There was great demand for the latter during the war and the prosperity of the town was greatly increased. The German advance of 1917-18 did not reach Ostashkov. The climate is damp and far from healthy. The Smolensky monastery, a pilgrim resort, and the seventeenth-century cathedral and several other ancient churches are among the interesting features of the vicinity. Pop. 10,457.

Ostend (ŏs-tĕnd'), a seaport of Belgium, province of West Flanders, on the North Sea, 67 miles northwest of Brussels. It is situated on a sandy plain, and is protected against the sea by a solid wall of granite, which extends for over two miles along the shore from the long jetty which protects the entrance to the port. It is a favorite seaside resort, the bathing being unsurpassed. In 1900 the work of widening the harbor and carrying it back several miles was begun. A series of large docks and extensive quays were constructed, which proved of great advantage to the Germans, who took possession of the town during the great war and used it as a submarine base.

The Belgian government was removed to Ostend, October 8, 1914, and it was to this town that King Albert and most of the Belgian army escaped following the surrender of Antwerp on October 9. On October 14 the seat of the Belgian government was again moved, from Ostend to Havre, France. On October 16 German troops entered Ostend. It was the intention of the invading hosts to press on along the coast to Calais, but their progress was brought to a halt a few miles beyond Ostend with the help of the small but efficient and superbly gallant British Regular Army. Both sides dug themselves in at this flank of the long battle line that stretched for 350 miles from the North Sea to the borders of Switzerland. The tide of battle ebbed and flowed over other sections of the line, but here at the coast the opposing armies remained locked for several years. Meanwhile Germany had shipped submarines by rail to Zeebrugge (*q. v.*) and Ostend, and with these harbors as a base began the work of demoralizing British shipping. Ostend was bombarded by the Allies from the sea and air; but it was not till 1918 that the British navy undertook the hazardous task of bottling up the submarines in the harbor, a feat that recalled Lieutenant Hobson's sinking of the Merrimac in Santiago Harbor during the war with Spain in 1898.

Two expeditions were undertaken. The first took place on April 23 and was a combined raid on Ostend and Zeebrugge. The Zeebrugge effort was a complete success, but at Ostend the British blockading ships grounded when near their objective and blew up. Undaunted, a second attempt was made on the night of May 9, under Commodore Hubert Lynes, directed by Vice-Admiral Sir Robert Keyes. The ship selected as the victim was the cruiser *Vindictive*, which had taken part in the successful raid on Zeebrugge and bore the scars of battle. It was at Dover that she was filled with concrete and set out on her last task. Convoyed by monitors and motor boats and hidden by smoke screens, the *Vindictive* was steered into the pier at Ostend and sunk by an internal charge, effectively blocking the harbor. The work was carried out in the face of a heavy fire from the German guns on the coast, which registered from six inches to monsters of fifteen-inch naval pieces in land turrets. It was one of the most daring and most successful naval exploits of the war, and the casualties were surprisingly few.

Ostend was founded in the ninth century, and was fortified in 1585 by the Prince of Orange. It endured a memorable siege from 1601 to 1604 in its struggle to throw off the yoke of Spain. The population in 1912 was 43,000.

Ostend Company, a trading company formed by the people of Ostend in 1717 in rivalry to the Dutch, English and French East India Companies. Settlements were founded in the East Indies and for a time the company was successful; but the jealousy of the other nations culminated in the seizure of Ostend merchantmen by the Dutch and the English, and in 1727 the emperor, Charles VI, who had encouraged the enterprise, was compelled to suspend the charter of the company for seven years. In 1731 the company was abolished.

Ostend Manifesto, a term used in American diplomatic history referring to a dispatch

drawn up at Ostend, October 9, 1854, by the United States ministers to Great Britain, France and Spain, who, at the request of President Pierce, had met to discuss the Cuban question. The dispatch declared that the sale of Cuba by Spain to the United States would be advantageous to both countries, and urged that if Spain refused to sell, self-preservation demanded that the United States take the island by force. The ministers suggested that a fair price would be $120,000,000. The suggestion was not approved in the United States, and was strongly condemned in Europe.

Osteology (os-tē-ol'ō-ji), the department of anatomical science specially devoted to a description of the bony parts or skeleton of the body. See *Anatomy*, *Skeleton*, *Bone*, etc.

Osteomalacia (os'teo-ma-lā'shi-ā), a disease of adult life, characterized by softening of the bones, often resulting in deformities. In the majority of cases it affects women, chiefly during pregnancy or after child-bearing. Surgery has proved more effective than medical treatment in this disease. It is prevalent in Austria and South Germany.

Osteopathy (os-tē-op'a-thi; Greek *osteon*, a bone; and *pathos*, suffering), a system of healing discovered by Dr. Andrew T. Still, of Kirksville, Mo., an old-school practitioner. He contended that health meant perfect adjustment of all the tissues of the body, together with normal flow of the vital fluids—namely, blood lymph and nerve force—and that disease had its beginning in an obstruction of some kind to the free flow of vital fluids. Obstructions in many cases are of a physical nature. They may be in the form of thickened connective tissues, subluxated bones, especially of the ribs or spine, contracted muscles, etc. These abnormalities the osteopath through his careful study in anatomy is able to recognize when present, and by manipulation correct. In the case of thickened, congested or contracted tissues, he stretches and loosens them and stimulates the circulation through them, thereby absorbing the excess tissue and re-establishing a normal condition of the tissues. In the case of subluxated bones, he reduces the luxations through a series of mechanical manipulations adapted to the particular bones in question, frequently using adjacent bones or muscles and ligaments as levers to aid in the correction. The manipulations are specific for the sole purpose of correcting lesions and re-establishing a normal circulation of the vital fluids. This is done without the use of drugs. At the present time osteopathy is recognized in nearly all the states of the Union as a separate system of healing and protected by special acts of legislature. Many well-equipped osteopathic schools have been established and modern osteopathic hospitals are maintained in connection with them. Besides the American School of Osteopathy at Kirksville, Mo., there are the Massachusetts College of Osteopathy at Boston, Mass.; Philadelphia College of Osteopathy at Philadelphia, Pa.; Des Moines Still College of Osteopathy, Des Moines, Ia.; Central College of Osteopathy, Kansas City, Mo.; Chicago College of Osteopathy, Chicago, Ill.; and the College of Osteopathic Physicians and Surgeons at Los Angeles. In addition to these schools, the profession has established the A. T. Still Osteopathic Research Institute at Chicago, Ill. There are about 7000 osteopathic physicians in the U. S. and Canada.

Osterode (os-te-rō'dē), the name of two Prussian manufacturing towns: (1) Prussia in Hanover. Pop. 7467. (2) A town of East Prussia. Pop. 13,057.

Ostia (os'ti-ä), an ancient port of Italy, at the mouth of the Tiber, 14 miles from Rome by the Via Ostiensis. It was the first colony founded by Rome. After the fall of the Roman Empire it became a ruin. Excavations have revealed a forum, a theatre, baths, etc.

Ostiaks or OSTYAKS (os'ti-aks), a race of Finnish origin, formerly numerous in several parts of Siberia, but which according to latest official returns now scarcely exceed 30,000, and are confined to the Obi and Irtish districts. In the latter they have become settled and Russianized, while in the former they mostly cling to their nomad life. They are generally low of stature, spare of figure, with dark hair, narrow eyes, large mouth and thick lips.

Ostracion (os-trā'si-on), the scientific name of the fishes known as trunk-fishes, included in the division Plectognathi, which forms a suborder of the Teleostei or bony fishes. The body is enclosed in a casing of strong bony plates or scales of the ganoid variety, immovably united.

Ostracism (os'tra-sizm; Greek, *ostrakon*, a shell), a measure practiced among the ancient Athenians by which persons considered dangerous to the State were banished by public vote for a term of years. It takes this name from the shell or tablet on which each citizen recorded his vote.

Ostræ'a. See *Oyster*.

Ostrava (os-tra'va), or OSTRAU, a town in Czechoslovakia, on the Ostrawitza, on the frontier of Polish Silesia. Numerous iron and coal mines are worked in the vicinity; other industries include the manufacture of bricks, metal ware, tin, zinc, malt, brandy, soap, etc. There is a school of mines here. Pop. (1921) 41,929.

Ostrich (os'trich; *Struthio camēlus*), a cursorial bird, of the family Struthionidæ, of which it is the type. It inhabits the sandy plains of Africa and Arabia, and is the largest bird existing, attaining a height of from 6 to 8 feet. The head and neck are nearly naked; the general body plumage is black, the wing and tail feathers white, occasionally with black markings; the quill-feathers of the wings and tail have their barbs wholly disconnected, hence their graceful appearance. The legs are extremely strong, the thighs naked. There are only two toes. The pubic bones are united, a conformation occurring in no other bird. The wings are of small size and are incapable of being used as organs of flight, but the birds can run with extraordinary speed, outdistancing the fleetest horse. The bill is broad and of a triangular depressed shape. The food consists of grass, grain, etc., and substances of a vegetable nature, and to aid in the trituration of this food the ostrich swallows large stones, bits of iron and glass, or other hard materials that come in the way. Ostriches are polygamous, each male consorting with several females, and they generally keep together in flocks. The eggs average 3 lbs. in weight, and several hens often lay from ten to twelve each in the same nest, which is merely a hole scraped in the sand. The eggs appear to be hatched mainly by the exertions of both parents relieving each other in the task of incubation, but also partly by the heat of the sun. The South African ostrich is often considered as a distinct species under the name of *S. austrālis*. Three South American birds of the same family (Struthionidæ), but of the genus *Rhea*, are popularly known as the American ostrich, and are very closely allied to the true ostrich, differing chiefly in having the head feathered and three-toed feet, each toe armed with a claw. (See *Rhea*.) The feathers of the back are those most valued, the wing and tail feathers rank next. Great Britain imports most of its ostrich feathers from Cape Colony. Ostriches having become scarce in that country, an attempt was made about 1865 to domesticate them, and with great success. They have been domesticated in California, Arizona, Texas, Florida, Mexico, and some other regions. The market value of the feathers naturally varies with their quality, the prevailing fashion, and the supply.

African Ostrich (*Struthio camēlus*).

Ostrog (ôs'trok), an old town in Russia, government of Volhynia. It is the place where the Bible was first printed in Slavonic. Pop. 16,000.

Ostrogoths. See *Goths*.

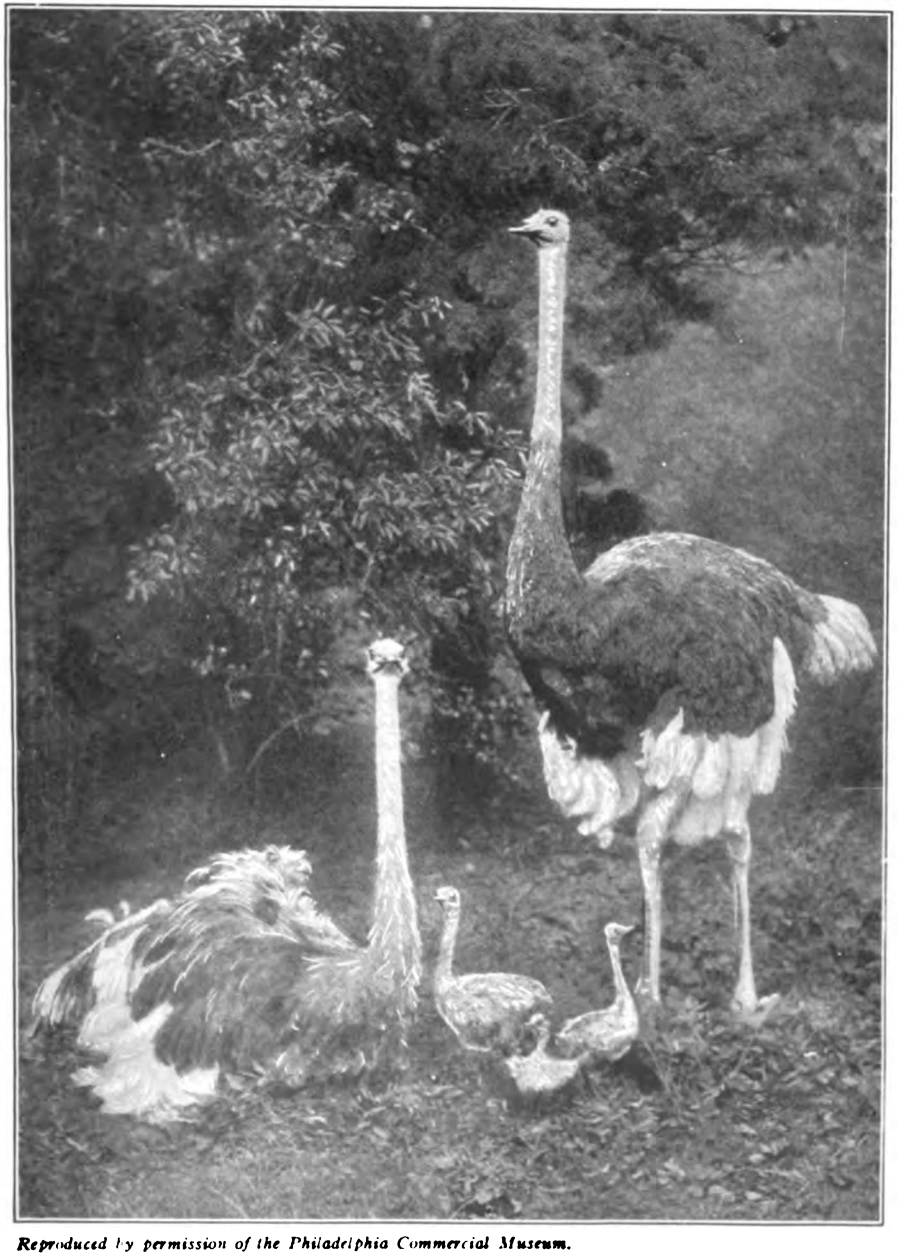
Ostrowo (ôs-trō'vō), a town of Prussia, district Posen. It has manufactures of woolen cloths. Pop. (1910) 14,757.

Ostuni (ôs-tö'nē), a town of Southern Italy, province Lecce; olives and almonds are cultivated. Pop. 7800.

Ostwald (ôst'vält), WILHELM, a German chemist born in Riga, Russia, in 1853, was appointed in 1887 professor of general chemistry and director of the Physico-chemical Institute of Leipzig University. His investigations, particularly in connection with solution, are remarkable for their originality, skill, and far-reaching conclusions. His published works include, *Outlines of General Chemistry*, *Solutions*, *Foundations of Analytical Chemistry*, *Principles of Inorganic Chemistry*, etc.

Osuna (ō-sö'na), a town of Southern Spain, in the province of and 41 miles east of Seville. It consists of spacious and well-paved streets, and has a magnificent church; manufactures of iron, linen, soap, articles in esparto, etc., and has a large trade in oil, grain, etc., with Seville and Malaga. Pop. 18,500.

Oswald (os'wold), King of Northumbria, 635–642. He ruled over an extensive territory, including Angles, Britons, Picts and Scots. He labored to



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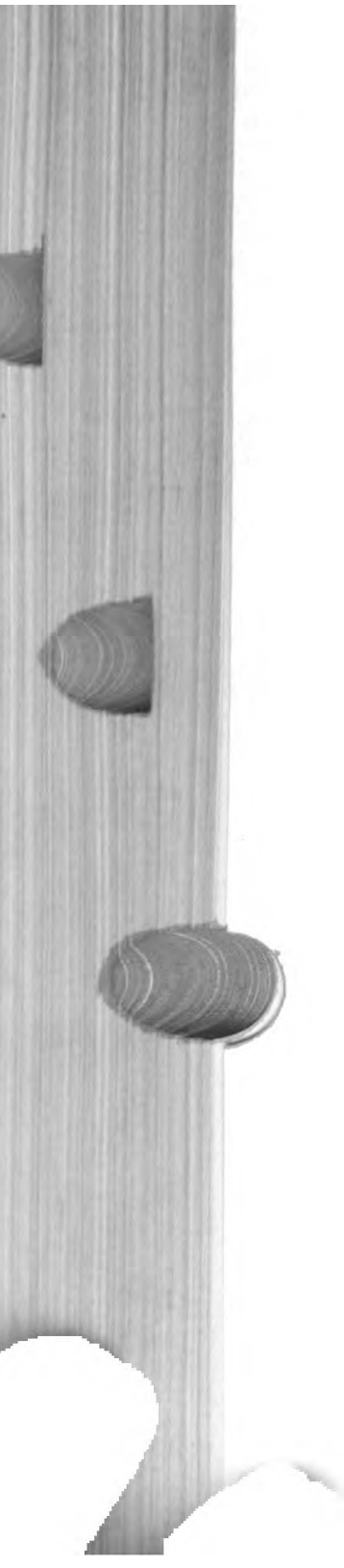
AN OSTRICH FAMILY

Africa is the ancient home of the ostrich, but it has been 'Americanized' with complete success and the raising of ostriches is now one of the great industries of Arizona. California has several ostrich farms and the feathers produced are equal to those imported from Africa.



establish Christianity on a firm footing, being in this assisted by St. Aidan. He died in battle against Penda of Mercia, and was reverenced as a saint.

Oswald (os'wold), FELIX LEOPOLD, naturalist, born at Namur, Belgium, in 1845; went to Mexico with the Belgium volunteers in 1860, afterwards resided in the United States as correspondent of French and English journals. He wrote *Summerland Sketches*, *Days and Nights in the Tropics*, and other works of travel and natural history. He died in 1906.

Oswaldtwistle (os'wald-twis'l), a town of England in Lancashire, 3 miles from Blackburn, with cotton factories, print-works, etc. Pop. 15,720.

Oswego (os-wē'gō), a city and port of New York, capital of Oswego County, situated on the S. E. shore of Lake Ontario, at the mouth of Oswego River. It has a good harbor and large shipments of grain, lumber and coal, though the commerce as a whole is comparatively unimportant. It is beautifully situated, regularly and handsomely built, and is famous for its vast starch factory, said to be the largest in the world. It has also extensive mills, match factories, foundries, machine shops, etc. The river supplies ample water power. The entrance to the port is guarded by Fort Ontario. There is here a State Normal School. It was founded as a trading post and military station in 1720 and became virtually a lake port of Albany. Being a place of great strategic importance its possession was contested in King George's war and the French and Indian wars. In 1757 Montcalm captured and destroyed two forts built here by Colonel Mercer. It was the center of military operations along the lake, and from here Amherst started for Quebec with a force of 10,000 men to meet Wolfe. In 1766 at Oswego occurred the famous meeting between Sir William Johnson (q. v.) and Pontiac, chief of the Ottawa Indians and leader of the confederate tribes of the Ohio valley and Lake region against the English; at this meeting the treaty of peace which Pontiac had agreed to in Detroit was submitted to the British. Pop. (1910) 23,368; (1920) 23,626.

Osymandyas (os-i-man'di-as), an ancient king of Egypt.

Otago (ō-tä'gō), one of the provincial districts of New Zealand, including the whole of the southern part of the South Island, south of the districts of Canterbury and Westland, being surrounded on the other three sides by the sea; area about 23,400 sq. miles. The interior is mountainous; many peaks attain the height of from 3000 to 9000 feet, but there is much pastoral land; the N. E. consists of extensive plains. Otago, although it possesses valuable gold fields, is chiefly a pastoral and agricultural district, second only to Canterbury in wheat production. The climate is similar to that of Britain, but warmer and more equable. The largest river is the Clutha or Clyde, the largest of New Zealand. There are also extensive lakes, as the Te Anau, 132 sq. miles; the Wakatipu, 112 sq. miles in area. Coal has been found in abundance. Otago was founded in 1848 by the Scotch Free Church Association; it is now the most populous division of the colony. Otago Bay, or Harbor, on the S. E. side of the island, is important from having the towns of Dunedin and Port Chalmers on its shores. The capital is Dunedin; the next town in importance is Oamaru. Pop. 200,000.

Otaheite (o-ta-hī'tē). See *Tahiti*.

Otalgia (ō-tal'ji-a), a painful affection of the ear. It may be due to inflammation of the ear; it may be a symptom of other diseases; or, it may be a species of neuralgia. It is often associated with other nervous ailments such as toothache, and neuralgic pains in the face; and as its intensity and duration generally depend upon the condition of the latter, otalgia is probably only a local symptom of the other troubles. Children, especially during their fast-growing period, are frequently subject to otalgic pains. The treatment adopted in neuralgic affections is usually and with success also applied to this complaint.

Otaria (ō-ta'ri-a), a genus of seals. See *Seal*.

Otfrid (ot'fret), or OTFRIED, a German theologian, philosopher, orator and poet, who lived in the middle of the ninth century. He wrote a rhymed version or paraphrase of the Gospels, in old High German, still extant, in which there are some passages of lyrical poetry. He completed it about 868.

Othman. See *Caliph*.

Otho I (ō'thō), the GREAT, Emperor of Germany, son of Henry I, born in 912; died in 973. He was crowned king of Germany at Aix-la-Chapelle in 936. His reign of thirty-six years was an almost uninterrupted succession of wars. After a fourteen years' struggle he subdued Boleslas, duke of Bohemia; he wrested the duchies of Sunbia, Bavaria and Lorraine from the Dukes of Bavaria and Franconia, and gave them (in 949) to his sons Ludolf

and Henry, and to his son-in-law Conrad, count of Worms, respectively. He delivered the Italians from the oppressions of Berengar II, married the widow of their last king, and was crowned king of Lombardy (951). In 961 he was crowned king of Italy, and in the following year emperor by Pope John XII, who took the oath of allegiance, but soon repented and took to arms. Otho deposed him and placed Leo VIII in the papal chair; he also punished the Romans for replacing John after his departure. The Byzantine court refused to acknowledge Otho's claim to the imperial dignity; but he defeated the Greek forces in Lower Italy, and the eastern emperor, John Zimisces, gave the Greek Princess Theophania to his son Otho in marriage.

Otho II, youngest son of Otho I, was born in 955; died at Rome in 983. His elder brothers had all died before their father, who caused him to be crowned king of Rome—the first instance of the kind in German history. He subdued the revolt of several powerful vassals, including his cousin, Henry II, duke of Bavaria. In Italy he suppressed a rising under Crescentius, and then attempted to drive the Greeks from Lower Italy; but they called in the aid of the Saracens from Sicily (981), and Otho suffered a total defeat (982). He escaped by leaping into the sea, was picked up by a Greek ship, from which he afterwards escaped by a ruse, and died soon after at Rome.

Otho III, son of the preceding, and the last of the male branch of the Saxon imperial house, was born in 980; died in 1002.

Otho I, King of Greece, second son of Louis of Bavaria, born in 1815; died in 1867. In 1832 he was elected King of Greece; but his Germanic tendencies caused continual friction, which ended in a rebellion and his abdication (1862). He spent the latter part of his life in Munich.

Otho, MARCUS SALVIUS, a Roman emperor, was born in 32 A.D.; died by his own hand in 69 A.D. He joined Galba when he rebelled against Nero, and on his accession in 67 Otho became his favorite and was made consul; but when Galba appointed Piso as his successor Otho bribed the army, had Galba and Piso murdered, and was proclaimed emperor in 69. He was acknowledged by the eastern provinces, but in Germany Vitellius was proclaimed by his legions. The latter having led his army into Italy, overthrew the forces of Otho at Bebriacum, who killed himself after reigning for three months and a few days.

Otididæ (o-tid'i-dē), a family of carinate birds comprising the bustards.

Otis (ō'tis), ELWELL STEPHEN, was born in Frederick, Maryland, in 1838. He became a captain in the Civil war, serving from September, 1862, and was severely wounded in 1864. After the war he remained in the army as lieutenant-colonel, fought in the Indian wars, and was sent to the Philippines as major-general of volunteers. He was military governor of Manila till May, 1900. He retired in 1902, and died in 1909.

Otis, JAMES, patriot, was born at West Barnstable, Massachusetts, in 1725; was graduated from Harvard 1743; was admitted to the bar and moved to Boston in 1750. In 1760 he inaugurated the American patriotic movement with a famous speech on trade relations. Elected to the legislature in 1762, he became a leader of the popular party and was sent to the 'Stamp Act' Congress, convened at New York in 1765. In print also he defended the cause of the colonies. Severely wounded by royalist ruffians in 1769, he became partly deranged, but lived until 1783.

Otley (ot'li), a town of England, West Riding of Yorkshire, 10 miles north from Bradford. Worsted, spinning and weaving, tanning and currying, etc., are carried on. Pop. 9843.

Otoliths (ō'tu-lethz), small vibrating calcareous bodies contained in the membranous cavities or labyrinths of the ears of some animals, especially of fishes and fish-like amphibia.

Otomis (o-tom'iz), a tribe of Mexican Indians, and one of the oldest in the mountainous region of the plateau. They were agriculturists and had ornaments of gold and copper and some knowledge of cloth-making. They came to the assistance of Cortez when besieging Mexico in 1521. Since then they have been nominally in subjection to the whites, but have made little progress in civilization. Their descendants, scattered through Central Mexico, number about 200,000.

Otranto (ō-trän'tō; ancient, *Hydruntum*), a town of Southern Italy, province of Lecce, or Terra di Otranto, on the strait of same name, 42 miles S. S. E. of Brindisi. It was once an important city, and its favorable position and harbor still secure it a certain amount of trade. The region of Otranto is fertile and thickly populated. Pop. 2295.

Otranto, DUKE OF. See *Fouché.*

Ottar of Roses. See *Attar.*

Ottava Rima (o-tä'va rē'ma; Italian, *octuple rhyme*), a form of versification consisting of stanzas of two alternate triplets, and concluding with a couplet. It seems to have been a favorite form with Italian poets even before the time of Boccaccio. The regular ottava rima is composed of eight eleven-syllable lines with dissyllabic rhyme.

Ottawa (ot'tà-wà), a river in the Dominion of Canada, forming for a considerable part of its length the boundary between the provinces of Quebec and Ontario. It rises in the high land which separates the basin of Hudson Bay from that of the St. Lawrence, about lat. 48° 30′ N., and after a course of some 750 miles discharges into the St. Lawrence above the island of Montreal. Six miles above the city of Ottawa rapids begin which terminate in the Chaudière Falls, where the river, here 200 feet wide, takes a leap of 40 feet. Its banks, mostly elevated, offer magnificent scenery. Immense quantities of valuable timber are floated down the Ottawa from the wooded regions of the interior to Ottawa city, where it is manufactured into lumber.

Ottawa, a city in the province of Ontario, capital of the Dominion of Canada, on the right bank of the Ottawa, about 90 miles above its confluence with St. Lawrence, 100 miles west of Montreal, on the Canadian Pacific, Grand Trunk, Canadian National and other railways. The city, divided into the Upper and Lower town by the Rideau Canal, has wide streets crossing at right angles, and some of the finest buildings in the Dominion. The chief are the government buildings (destroyed by fire Feb. 3. 1916, but rebuilt), constructed of Nepean sandstone obtained in the vicinity. They stand on elevated ground and form one of the finest groups of public buildings in the world. The main entrance is through the Central Tower, dedicated to Victory and Peace; the foundation stone was laid by the Prince of Wales Sept. 1. 1919. Other notable buildings are the National Victoria Museum, Parliamentary Library, National Art Gallery, Royal Observatory, Royal Mint, Chateau Laurier Hotel, etc. It has a number of good schools and the University of Ottawa (Roman Catholic). Ottawa is lavishly supplied with parks and driveways of great beauty, and many picturesque lake and river trips may be made. It is the industrial and commercial metropolis of eastern Ontario, with abundance of water power and nearby sources of raw material. It is one of the greatest lumber centers of the world, and has great industrial factories. Pop. (1911) 87,062; (1921) 107,843.

Ottawa, a city of Illinois, county seat of Lasalle Co., 82 miles s. w. of Chicago, on the Illinois and Michigan Canal, and on the Rock Island and other railroads. Pleasant View College and St. Francis Xavier Academy are here. It has manufactures of pottery, glassware, brick and tile, farm implements, pianos, organs, etc. Deposits of clay, glass sand and coal are in the vicinity. Pop. (1910) 9535; (1920) 10,816.

Ottawa, a city, county seat of Franklin Co., Kansas, on the Marais des Cygnes River, 60 miles s. w. of Kansas City. Ottawa University (Baptist) is here. It has the machine shops of the Santa Fé R. R., flour mills, foundries, condensing plant, and manufactures of gas engines, windmills, etc. Pop. (1920) 9018.

Otter (ot'er), a carnivorous mammal, family Mustelidæ or weasels, genus *Lutra*. There are several species, differing chiefly in size and fur. They all have large flattish heads, short ears, webbed toes, crooked nails, and tails slightly flattened horizontally. The common river-otter, the *Lutra vulgāris* of Europe, inhabits the banks of rivers, feeds principally on fish, and is often

American Otter (*Lutra Canandensis*)

very destructive, particularly to salmon. The under fur is short and woolly, the outer is composed of longer and coarser hairs of dark-brown hue. They burrow near the water's edge, line their nest with grass and leaves, and produce from four to five young. The weight of a full-grown male is from 20 to 24 lbs.; length from nose to tail 2 feet; tail 15 to 16 inches. A species of otter (*Lutra nair*) is tamed in India by fishermen, and used for hunting fish; and in Europe tame otters have occasionally been kept for a similar purpose. The American or Canadian otter (*Lutra Canadensis*) averages about 4 feet in length inclusive of the tail. It is plentiful in Canada, and furnishes a valuable fur, which is a deep reddish-brown in winter, and blackish in summer. The sea-otters (*Enhydra*), represented typically by the great sea-otter

(*E. marina*), inhabit the coasts of the North Pacific Ocean, but are very rare.

Otterbein (ot'ẽr-bīn), PHILIP WILLIAM, an American evangelist, born at Dillenburg, Germany, June 4, 1726; died at Baltimore, Md., November 17, 1813. He was a clergyman of the German Reformed Church and came to Pennsylvania in 1752. In 1789 he organized the sect of the United Brethren in Christ (which see).

Ottoman Empire (o t'u-man), or the empire of Turkey, the territories in Europe, Asia and Africa more or less under the sway of the Turkish sultan. In Europe, it formerly covered a large area, but has been reduced by various wars, notably the Balkan wars and the great European war of 1914-18, to a small strip of territory around and including Constantinople. In Asia, prior to the European war, it included Asia Minor, Syria (with Palestine), Armenia, Mesopotamia, part of Arabia, some of the islands; and in Africa it had a nominal suzerainty over Egypt. Egypt is now independent, as is Armenia; Mesopotamia, Palestine and Syria are placed under mandatories; and the zone of the Straits is placed under the control of the League of Nations. By the war the Ottoman Empire lost an area of over 430,000 sq. miles. (For government, etc., see article on *Turkey*.)

The Ottoman Turks came originally from the region of the Altai Mountains, in Central Asia, and in the sixth century A.D. pushed onward to the west in connection with other Turkish tribes. Early in the eighth century they came in contact with the Saracens, from whom they took their religion, and of whom they were first the slaves and mercenaries, and finally the successors in the caliphate. In the thirteenth century they appeared as allies of the Seljukian Turks against the Mongols, and for their aid received a grant of lands from the Seljuk sultan of Iconium in Asia Minor. Their leader, Othman or Osman, of the race of Oghuzian Turkomans, became the most powerful emir of Western Asia, and after the death of the Seljuk sultan of Iconium in the year 1300 he proclaimed himself sultan. He died in 1326. Thus was founded upon the ruins of the Saracen, Seljuk and Mongol power the Empire of the Osman or Ottoman Turks in Asia; and after Osman, the courage, policy and enterprise of eight great princes, whom the dignity of caliph placed in possession of the standard of the Prophet, and who were animated by religious fanaticism and a passion for military glory, raised this powerful empire to the rank of the first military power in both Europe and Asia (1300-1566).

The first after Osman was his son Orkham. He subdued all Asia Minor to the Hellespont, took the title of *Padishah*, and became son-in-law to the Greek Emperor Cantacuzenus. Orkhan's son, Soliman, first invaded Europe in 1355. He fortified Gallipoli and Sestos, and thereby held possession of the straits which separate the two continents. In 1360 Orkhan's second son and successor, Amurath I, took Adrianople, which became the seat of the empire in Europe, conquered Macedonia, Albania and Servia, and defeated a great Slav confederation under the Bosnian King Stephen at Kossova in 1389. After him Bajazet, surnamed Ilderim (*Lightning*), invaded Thessaly, and also advanced towards Constantinople. In 1396 he defeated the Western Christians under Sigismund, King of Hungary, at Nicopolis, in Bulgaria; but at Angora in 1402 he was himself conquered and taken prisoner by Timour, who divided the provinces between the sons of Bajazet. Finally, in 1413 the fourth son of Bajazet, Mohammed I, seated himself upon the undivided throne of Osman. In 1415 his victorious troops reached Salzburg and invaded Bavaria. He conquered the Venetians at Thessalonica in 1420; and his celebrated grand-vizier Ibrahim created a Turkish navy. Mohammed was succeeded by his son, Amurath II, who defeated Ladislaus, King of Hungary and Poland, at Varna in 1444. Mohammed II, the son of Amurath, completed the work of conquest (1451-81). He attacked Constantinople, which was taken May 29, 1453, and the Byzantine Empire came finally to an end. Since that time the city has been the seat of the Sublime Porte or Turkish government. Mohammed added Servia, Bosnia, Albania and Greece to the Ottoman Empire, and threatened Italy, which, however, was freed from danger by his death at Otranto in 1480. His grandson, Selim I, who had dethroned and murdered his father in 1517, conquered Egypt and Syria. Under Soliman II, *the Magnificent*, who reigned between 1519 and 1566, the Ottoman Empire reached the highest pitch of power and splendor. In 1522 he took Rhodes from the Knights of St. John, and by the victory of Mohacz, in 1526, subdued half of Hungary. He exacted a tribute from Moldavia, made Bagdad, Mesopotamia and Georgia subject to him, and threatened to overrun Germany, but was checked before the walls of Vienna (1529). Soliman had as an opponent Charles V of Germany; as an ally Francis II of France. From his

time the race of Osman degenerated and the power of the Porte declined.

In the latter part of the sixteenth century, and most of the seventeenth century, the chief wars were with Venice and with Austria. The battle of Lepanto (1571), in which the Ottoman fleet was overthrown by the combined fleets of Venice and Spain, was the first great Ottoman reverse at sea; and the battle of St. Gothard (1664), near Vienna, in which Montecuculi defeated the Vizier Kiuprili, the first great Ottoman reverse on land. In 1683 Vienna was besieged by the Turks, but was relieved by John Sobieski and Charles of Lorraine; in 1687 the Turks were again defeated at Mohacz, and in 1697 (by Prince Eugene) at Szenta. Then followed the Treaty of Carlowitz in 1699, by which Mustapha II agreed to renounce his claims upon Transylvania and a large part of Hungary, to give up the Morea to the Venetians, to restore Podolia and the Ukraine to Poland, and to leave Azov to the Russians. Eugene's subsequent victories at Peterwardein and Belgrade obliged the Porte to give up, by the Treaty of Passarowitz in 1718, Temeswar, Belgrade, with a part of Servia and Walachia; but the Turks on the other hand took the Morea from Venice, and by the Treaty of Belgrade in 1739 regained Belgrade, Servia and Little Walachia, while for a time they also regained Azov.

Russia, which had been making steady advances under Peter the Great and subsequently, now became the great opponent of Turkey. In the middle of the eighteenth century the Ottoman Empire still embraced a large part of Southern Russia. The victories of Catharine II's general Romanzoff in the war between 1768 and 1774 determined the political superiority of Russia, and at the Peace of Kutchuk-Kainargi, in 1774, Abdul-Hamid was obliged to renounce his sovereignty over the Crimea, to yield to Russia the country between the Bog and the Dnieper, with Kinburn and Azov, and to open his seas to the Russian merchant ships. By the Peace of Jassy, 1792, which closed the war of 1787-91, Russia retained Taurida and the country between the Bog and the Dniester, together with Otchakov, and gained some accessions in the Caucasus. In the long series of wars which followed the French revolution the Ottoman Empire first found herself opposed to France, in consequence of Bonaparte's campaign in Egypt, and finally to Russia, who demanded a more distinct recognition of her protectorate over the Christians, and to whom, by the Peace of Bucharest, May 28, 1812, she ceded that part of Moldavia and Bessarabia which lies beyond the Pruth. In 1817 Mahmud II was obliged to give up the principal mouth of the Danube to Russia. Further disputes ended in the Porte making other concessions, which tended towards loosening the connection of Servia, Moldavia and Walachia with Turkey. In 1821 broke out the war of Greek independence. The remonstrances of Britain, France and Russia against the cruelties with which the war against the Greeks was carried on proving of no avail, those powers attacked and destroyed the fleet of Mahmud at Navarino (1827). In 1826 the massacre of the Janizaries took place at Constantinople, after a revolt. In 1828-29 the Russians crossed the Balkans and took Adrianople, the war being terminated by the Peace of Adrianople (1829). In that year Turkey had to recognize the independence of Greece. In 1831-33 Mehemet Ali, nominally Pasha of Egypt, but real ruler both of that and Syria, levied war against his sovereign in 1833, and threatened Constantinople; when the Russians, who had been called on for their aid by the sultan, forced the invaders to desist. In 1840 Mehemet Ali again rose against his sovereign; but through the active intervention of Great Britain, Austria and Russia was compelled to evacuate Syria, though he was, in recompense, recognized as hereditary viceroy of Egypt.

The next important event in the history of the Ottoman Empire was the war with Russia in which Turkey became involved in 1853, and in which she was joined by England and France in the following year. This war, known as the Crimean war (which see), terminated with the defeat of Russia, and the conclusion of a treaty at Paris on March 30, 1856, by which the influence of Russia in Turkey was greatly reduced. The principal articles were the abolition of the Russian protectorate over the Danubian principalities (Moldavia and Walachia, united in 1861 as the principality of Roumania), the rectification of the frontier between Russia and Turkey, and the cession of part of Bessarabia to the latter power.

In 1875 the people of Herzegovina, unable to endure any longer the misgovernment of the Turks, broke into rebellion. A year later the Servians and Montenegrins likewise took up arms, and, though the former were unsuccessful and obliged to abandon the war, the Montenegrins still held out. Meantime the great powers of Europe were pressing reforms on Turkey, and at the end of 1876 a conference met at Constantinople with

the view of making a fresh settlement of the relations between her and her Christian provinces. All the recommendations of the conference were, however, rejected by Turkey; and in April following, Russia, which had been coming more and more prominently forward as the champion of the oppressed provinces and had for months been massing troops on both the Asiatic and the European frontier of Turkey, issued a warlike manifesto and commenced hostile operations in both parts of the Turkish Empire. It was immediately joined by Roumania, who on the 22d of May (1877) declared its independence. The progress of the Russians was at first rapid; but the Turks offered an obstinate resistance. After the fall of Kars, however, November 18, and the fall of Plevna, December 10, the Turkish resistance completely collapsed, and on March 3, 1878, Turkey was compelled to agree to the Treaty of San Stefano, in which she accepted the terms of Russia. The provisions of this treaty were, however, considerably modified by the Treaty of Berlin concluded on July 13th following, by which Roumania, Servia and Montenegro were declared independent; Roumanian Bessarabia was ceded to Russia; Austria was empowered to occupy Bosnia and Herzegovina; and Bulgaria was erected into a principality. It became an independent monarchy in 1908, and in the same year Bosnia and Herzegovina were annexed to the Austrian Empire. (See *Berlin, Treaty of.*)

The main events in the history of the Ottoman Empire since the conclusion of the Treaty of Berlin are the French invasion of Tunis in 1881, which soon after was formally placed under the protectorate of the French; the treaty with Greece, executed under pressure of the Great Powers in 1881, by which Turkey ceded to Greece almost the whole of Thessaly and a strip of Epirus; the occupation of Egypt by Great Britain in 1882; and the revolution at Philippopolis in 1885, when the government of Eastern Roumelia was overthrown, and the union of that province with Bulgaria proclaimed. A constitution granted in 1876 was quickly revoked by the reigning sultan, Abdul Hamid II, who reigned as an autocrat until 1908, when he was obliged to yield to the demands of the Young Turk reform party and restore the constitution and legislature. In April, 1909, a reactionary military outbreak, supposed to be fomented by the sultan, led to the capture of the city by a revolutionary army and his deposition. On April 27, his brother, Mohammed Rechad, succeeded as Mohammed V. In 1911 Tripoli was severed from the Ottoman Empire by Italy. The Balkan wars (1912-13) and the European war (1914-18) reduced the great empire to a total area (estimated) of 174,900 sq. miles and a population of but 8,000,000. (For constitution, government, etc., see *Turkey.*)

Ottumwa (o-tum'wȧ), county seat of Wapello Co., Iowa, on Des Moines River, 90 miles S. E. of Des Moines, in a rich agricultural, stock-raising and coal-mining section. It has meat-packing plants, farm-implement and motor-truck manufactures, etc. It has the commission form of government. Pop. (1910) 22,012; (1920) 23,003.

Otway (ot'wā), THOMAS, an English dramatist, was born in 1651; educated at Winchester and Oxford, and produced his first tragedy in 1675. As a tragic writer he excelled in pathos, his fame chiefly resting upon his *Orphan* and *Venice Preserved.* The latter is still occasionally played. He died in 1685.

Oubliette (ö'bli-et), a dungeon existing in some old castles and other buildings, with an opening only at the top for the admission of air. It was used for persons condemned to perpetual imprisonment or to perish secretly.

Oudenarde (ö-dn-ärd), a town of Belgium, province of East Flanders, on the Scheldt, 15 miles south of Ghent. It has sustained several sieges, but is best known in history by the memorable victory gained over the French on July 11, 1708, by Prince Eugene and the Duke of Marlborough. Pop. 6572.

Oudh, or OUDE (oud), a province of British India, bounded on the north by Nepaul, and on other sides by the Northwest Provinces; area, 24,217 square miles. Oudh is a vast alluvial plain, watered by the Gogra, Gumti, Kapti and Ganges. It is for the most part highly fertile, and wheat, barley, rice, sugar, indigo, and others of the richest products of India are raised in large quantities. Oudh, formerly a Mogul province (subsequently kingdom, 1819), became subordinate to the British after the battle of Kalpe, in 1765. In 1856 complaints of the misgovernment of the king of Oudh led to the annexation of the country to the British dominions, an annual pension of £120,000 being settled on the king. This measure, however, produced much dissatisfaction, and when, in 1857, the mutiny broke out, most of the Oudh sepoys joined it, and the siege of Lucknow resulted. (See *Indian Mutiny.*) Since the pacification of 1858, schools and courts of justice have been

established, and railways have been opened. Lucknow is the capital, and the main center of population and manufactures. Pop. 12,833,077 (mostly Hindus), giving the large average of 522 to the square mile.

Oudh (formerly Ayodhya), an ancient town in Faizabad District, Oudh, of which province it was anciently the capital. In remote antiquity it was one of the largest and most magnificent of Indian cities, and is famous as the early home of Buddhism and of its modern representative, Jainism. It is now a suburb of Faizabad, or Fyzabad (which see).

Oudinot (ō-di-nō), CHARLES NICOLAS, Duke of Reggio, peer and marshal of France, born in 1767. In 1791 he was elected commandant of a volunteer battalion, and gave many striking proofs of valor, which gained him speedy promotion. In 1792 he was colonel of the regiment of Picardy, in 1793 brigadier-general, and in 1799 general of division. Masséna made him chief of the general staff, and under his command he decided the battle of the Mincio. In 1804 Napoleon gave him the command of a grenadier corps of 10,000 men, which was to form the advance guard of the main army. At the head of these troops he performed many exploits, winning the battle especially of Ostrolenka, and deciding the fate of three great battles—Austerlitz, Friedland and Wagram. After the last named battle Napoleon made him a marshal and Duke of Reggio, and gave him an estate worth $20,000 a year. He rendered valuable service and was severely wounded in the Russian campaign of 1812. In the campaign of 1813 he was defeated at Grossbeeren and Dennewitz. In the campaign of 1814 he took an active part and was wounded for the twenty-third time. After Napoleon's abdication he gave in his adhesion to the Bourbons, to whom he ever afterwards remained faithful, and who heaped upon him every honor. He died in 1847.—His eldest son, NICOLAS CHARLES VICTOR (born in 1791), commanded the troops which effected the capture of Rome from Garibaldi in 1849. He died in 1863.

Ouida (wē'da). See *Ramée, Louisa de la.*

Ouija (wē'ja), from the French word *oui*, 'yes,' and the German *ja*, 'yes,' a device used to obtain spirit messages. It consists of a board on which are the letters of the alphabet, and a small three-legged table. When the hands of two sufficiently sensitive persons are placed on the small table it moves over the board, spelling out answers to questions. (See also *Planchette.*)

Ounce (ouns; Latin, *uncia*, a twelfth part of any magnitude), in Troy weight, is the twelfth part of a pound, and weighs 480 grains; in avoirdupois weight is the sixteenth part of a pound, and weighs 437½ grains Troy.

Ounce (*Felis Uncia*), one of the digitigrade carnivora, found in Northern Africa, Arabia, Persia, India and China. The length of the body is about 3½ feet, the tail measuring about 2 feet. It is a large cat, resembling the leopard and panther, but with a longer and more hairy tail and a thicker fur, somewhat less in size, and not so fierce and dangerous. In some places it is trained to hunt, like the cheetah.

Ourebi (ou're-bi), *Scopophorus ourebi*, an antelope of South Africa, found in great numbers in the open plains, and much hunted for its flesh. It is from 2 to 3 feet high, of a pale dun color, and the male has sharp, strong and deeply-ringed horns.

Ouro-Preto (ō'rụ prā'tụ), a town of Brazil, capital of the province of Minas-Geraes, 190 miles N. N. W. of Rio de Janeiro. It was formerly one of the great mining centers of Brazil, but its gold mines are now nearly exhausted. Pop. about 13,000.

Ouse (ōz), a river of Yorkshire, formed by the junction of the Swale with the Ure near Boroughbridge; it flows tortuously southeast past York, Selby and Goole, 8 miles east of which it unites with the Trent to form the estuary of the Humber. Its total course is 60 miles, for the last 45 of which (or to York) it is navigable.

Ouse (ōz), GREAT, a river of England, rises near Brackley in the county of Northampton, flows in a general northeasterly direction, traverses the counties of Buckingham, Bedford, Huntingdon, Cambridge and Norfolk, and falls into the Wash at King's Lynn, after a course of about 160 miles, two-thirds of it being navigable.

Ousel. See *Ouzel.*

Ouseley (ouz'lē), SIR FREDERICK ARTHUR GORE, BART.; English composer, born in 1825; only son of Sir Gore Ouseley, at one time British ambassador to Persia and Russia. He succeeded his father in the baronetcy in 1844, and subsequently took orders. He exhibited from childhood high musical ability, took the degree of Bachelor of Music at Oxford in 1850, and of Doctor in 1855, and the same year was appointed precentor of Hereford Cathedral. His works include treatises on *Harmony*, on *Counterpoint and Fugue*, and on *Mu-*

sical Form and general composition, and he wrote much church music. He died in 1889.

Outcrop (out'krop), in geology, the exposure of an inclined stratum at the surface of the ground.

Outlawry (out'lą-ri), the putting one out of the protection of the law, a process resorted to against an absconding defendant in a civil or criminal proceeding. It involved the deprivation of all civil rights, and a forfeiture of goods and chattels to the crown. Outlawry in civil proceeding was formally abolished in England in 1879. In Scotland outlawry is a sentence pronounced in the supreme criminal court, where one accused of a crime does not appear to answer the charge. The effect is that he is deprived of all personal privilege or benefit by law, and his movable property is forfeited to the crown. In the United States the practice is unknown.

Outram (ou'tram), Sir James, diplomat and soldier, was born at Butterley Hall, Derbyshire, in 1803. He was brought up in Scotland, studied at Marischal College, Aberdeen, and in 1819 went out as a cadet to India. In 1828 he was selected to undertake a mission to the wild hill tribes of the Bombay presidency, a task in which he acquitted himself with credit. As adjutant to Lord Keane he took part in the Afghan war of 1839, and distinguished himself at the capture of Khelat, and by his dangerous ride disguised as a native devotee through the enemy's country to Kurrachee (1840). After the capture of Ghuznee, he performed the duties of British resident at Hyderabad, Sattara and Lucknow. In 1842 he was appointed commissioner to negotiate with the Ameers of Sind, in which position he adopted views at variance with the aggressive policy of General Sir Charles James Napier. In 1856 he was nominated chief commissioner of Oudh. He was commander-in-chief of the British forces in the Persian war of 1856-57, and from Persia was summoned to India to aid in suppressing the mutiny. Although of higher rank than Havelock, whom he joined with reinforcements at Cawnpore in September, 1857, he fought under him until Lucknow was relieved by Sir Colin Campbell. In the following March he commanded the first division of infantry when Sir Colin finally regained possession of Lucknow. His services were rewarded with a baronetcy, the rank of lieutenant-general, the order of the grand-cross of the Bath, and the thanks of parliament; and statues were erected in his honor in London and Calcutta. The shattered state of his health compelled him to return to England in 1860. He died at Pau in 1863, and was buried in Westminster Abbey.

Outrigger (out'rig-ėr), an iron bracket fixed on the side of a boat, with a rowlock at its extremity, so as to give an increased leverage to the oar without widening the boat; hence, a light boat for river matches provided with such apparatus. The name is also applied to a contrivance in certain foreign boats and canoes, consisting of a projecting framework or arrangement of timbers for counterbalancing the heeling-over effect of the sails, which are large in proportion to the breadth of the vessel.

Outworks (out'wurkz), all works of a fortress which are situated without the principal line of fortification, for the purpose of covering the place and keeping the besiegers at a distance.

Ouvirandra (ō-vi-ran'dra), a genus of plants. See *Lattice-leaf.*

Ouzel (ou'zl), a genus of insessorial or perching birds, included in the family of the thrushes. The common or ring ouzel (*Turdus torquātus*) is a summer visitant of Britain, and its specific name is derived from the presence of a broad semilunar patch or stripe of white extending across its breast. The water ouzel (*Cinclus aquaticus*) belongs to a different family. (See *Dipper.*) Ouzel is also an old or poetical name for the blackbird.

Oval (ō'val), an egg-shaped curve or curve resembling the longitudinal section of an egg. The oval has a general resemblance to the ellipse, but, unlike the latter, it is not symmetrical, being broader at one end than at the other. See *Ellipse*

Ovampos (ō-vam'pos), a collection of black tribes of Southwest Africa, occupying the exceedingly fertile country which lies south of the Cunene River, between 14° and 18° E. longitude, and north of Damara-land. These black tribes resemble the Kaffirs and Damaras in feature, and by many are supposed to be a connecting link between Negroes and Kaffirs. Cattle forms the wealth of the Ovampo tribes, each of which has its own hereditary chief. They are also good agriculturists, and have made considerable progress in various arts.

Ovar (ō-vär'), a town of Portugal, district of Beira, near the Atlantic, on the north shore of the Bay of Aveiro, 22 miles south of Oporto. It is in a low-lying and unhealthy region, but has valua-

ble fisheries and considerable trade in timber. Pop. 10,462.

Ovarian Tumor (ō-vā'ri-an), a morbid growth in the ovary of a woman, sometimes weighing as much as 30, 50, or upwards of 100 lbs., or more, consisting of a cyst containing a thin or thick ropy fluid, causing the disease known as *ovarian dropsy*, which is now generally cured by the operation of ovariotomy.

Ovariotomy (ō-vā-ri-ot'ō-mi), the operation of removing the ovary, or a tumor in the ovary (see above); a surgical operation first performed in 1809, and long considered exceedingly dangerous, but latterly performed with great and increasing success, especially since the adoption of the antiseptic treatment inaugurated by Lister.

Ovary (ō'va-ri), or OVARIUM, the essential part of the female generative apparatus, in which the ova or eggs are formed and developed. The ovary in the female corresponds to the *testis* of the male. In adult women the ovaries exist as two bodies of somewhat oval shape, and compressed from side to side, of whitish color and uneven surface. They are situated one on each side of the womb, and are attached to the hinder portion of the body of the womb by two thin cord-like bands—the *ovarian ligaments*, and by a lesser fibrous cord to the fringed edge of the fallopian tube. Each ovary is about 1½ inches in length, and about 1½ drachms in weight, and contains a number of vesicles known as ovisacs or Graafian follicles, in which the ova are developed. The functions of the ovary, which are only assumed and become active on the approach of puberty, are the formation of ova, their maturation, and their final discharge at periodic menstrual epochs into the uterus or womb. There the ovum may be impregnated and detained, or pass from the body with the menstrual flow. The ovaries are subject to diseased conditions, chief among which are cancer and the occurrence of tumors and cysts. See *Ovarian Tumor, Ovariotomy.*

O'vary, in botany, is a hollow case enclosing ovules or young seeds, containing one or more cells, and ultimately becoming the fruit. Together with the style and stigma it constitutes the female system of the vegetable kingdom. When united to the calyx it is called inferior; when separated, superior.

Ovation. See *Triumph.*

Oven (uv'n), a close chamber of any description in which a considerable degree of heat may be generated, used for baking, heating, or drying any substance. In English the term is usually restricted to a close chamber for baking bread and other food substances, but ovens are also used for coking coal, in the arts of metallurgy, in glass making, pottery, etc. There is now a great diversity in the shape and materials of construction, and modes of heating ovens.

Oven Birds, birds belonging to the family Certhidæ or Creepers, found in South America; typical genus, *Furnarius.* They are all of small size, and feed upon seeds, fruits and insects. Their popular name is derived from the form of their nest, which is dome-shaped, and built of tough clay or mud with a winding entrance.

Ovens River, a river in the northeast of the Australian colony of Victoria, a tributary of the Murray. The district is an important gold mining and agricultural one.

Over (ō'vėr), an ancient town of Cheshire, 4 miles W. of Middlewich, has boat building and manufactures of salt. Pop. (1911) 13,778.

Overbeck (ōv'er-bek), FRIEDRICH, a German painter, born at Lübeck in 1789; died in 1869. He commenced his artistic studies in Vienna in 1806, and in 1810 went to Rome, where he, with Cornelius, Schadow, Veit and Schnorr, founded a new school of art, which subordinated beauty to piety, and attempted to revive the devotional art of the pre-Raphaelite period. In 1814, in company with several of his artistic brethren, he abjured Lutheranism, embraced the Roman Catholic faith, and made Rome almost exclusively the place of his abode. Among his chief works are: *The Entrance of Christ into Jerusalem; Christ on the Mount of Olives; The Entombment; The Triumph of Religion; The Vision of St. Francis;* two series of frescoes, one on the *History of Joseph* for the Casa Bartholdi, and one on Tasso's *Gerusalemme Liberata* for the Villa Massimi at Rome, etc.

Overbury (ō'ver-be-ri), SIR THOMAS, known as a miscellaneous writer, but more especially for his tragical death at the instance of the Earl of Rochester and the Countess of Essex, was born in Warwickshire in 1581, and studied at Oxford. He contracted an intimacy with Rochester, then Robert Carr, at the court of James I. and provoked the anger of the countess by endeavoring to dissuade his friend from marrying her. Rochester procured the imprisonment of his late friend in the Tower of London, by creating a cause of offense between him and the king

and, some months later, caused him to be poisoned there, September 15, 1613. Though suspicions were entertained at the time, it was not till 1616 that this deed of darkness was discovered, when the inferior agents were all apprehended, tried, and executed. Rochester, now earl of Somerset, and the countess were also tried and condemned, but they were both pardoned by the king for private reasons. Overbury's *Characters*, and *The Wife*, a didactic poem, published in 1614, have still a reputation.

Over Darwen. See *Darwen*.

Overijssel (ō-vėr-Is'sėl), or OVERYSSEL, a province of the Netherlands; area, 1283 square miles. It is watered by the Ijssel, which separates it from Gelderland, and by the Vecht and its affluents. Except a strip along the Ijssel, presenting good arable and meadow land, the surface is mostly a sandy flat relieved by hillocks, and the principal industry is stock raising, and dairy farming. Chief towns, Zwolle, Deventer, Almelo and Kampen. Pop. 359,443.

Overshot Wheel (ō'ver-shot), a wheel driven by water shot over from the top. The buckets of the wheel receive the water as nearly as possible at the top, and retain it until they approach the lowest point

Overshot Water-wheel.

of the descent. The water acts principally by its gravity, though some effect is of course due to the velocity with which it arrives.

Overture (ō'ver-tūr), in music, an introductory symphony, chiefly used to precede great musical compositions, as oratorios and operas, and intended to prepare the hearer for the following compositions, properly by concentrating its chief musical ideas so as to give a sort of outline of it in instrumental music. This mode of composing overtures was first conceived by the French. Overtures are, however, frequently written as independent pieces for the concert room.

Ovibos. See *Musk-ox*.

Ovid (ov'id), in full, PUBLIUS OVIDIUS NASO, a celebrated Roman poet, born in 43 B.C. He enjoyed a careful education, which was completed at Athens, where he gained a thorough knowledge of the Greek language. He afterwards traveled in Asia and Sicily. He never entered the senate, although by birth entitled to that dignity, but filled one or two unimportant public offices. Till his fiftieth year he continued to reside at Rome, enjoying the friendship of a large circle of distinguished men. By an edict of Augustus, however (A.D. 8), he was commanded to leave Rome for Tomi, a town on the inhospitable shores of the Black Sea, near the mouths of the Danube. It is impossible now to come to any certain conclusion as to the cause of this banishment, that given in the edict—the publication of the *Art of Love*—being merely a pretext, the poem having been in circulation ten years previously. The real cause may have been his intrigue with Julia, the clever but dissolute daughter of Augustus, whom he is supposed to have celebrated under the name of Corinna; or it may have been his complicity in the intrigue of Julia, the granddaughter of Augustus, with Silanus. The change from the luxurious life of a Roman gallant to that of an exile among barbarians whose very language was unknown to him must have been far from agreeable, and we find him addressin humble entreaties to the imperial court to shorten the term or change the place of banishment; but these entreaties, backed up by those of his friends in Rome, were of no avail; and Ovid died at Tomi in the year 18 A.D. He had been three times married. His works include *Amorum Libri III*, love elegies; *Epistolæ Heroïdum*, letters of heroines to their lovers or husbands; *Ars Amatoria*, ('Art of Love'); *Remedia Amoris*, ('Love Remedies'); the *Metamorphoses*, in fifteen books; *Fasti*, a sort of poetical calendar; *Tristia; Epistolæ ex Ponto*, ('Epistles from Pontus'), etc.

Oviduct (ov'i-dukt), the name given to the canal by which, in animals, the ova or eggs are conveyed from the ovary to the uterus or into the external world. In mammals the oviducts are termed *Fallopian tubes*, being so named after the anatomist who first described them.

Oviedo (ō-vi-ā'dō), a town of Spain, capital of a province of same

name, 230 miles northwest of Madrid. It was founded in 762, has a fourteenth century cathedral and a university, and manufactures of hats, arms, napery, etc. Pop. 48,103.—The province, area 4080 square miles, pop. 627,069, is situated on the Bay of Biscay, and bounded by the provinces of Santander, Leon and Lugo. It has a wild and stormy coast, and a mountainous interior better adapted for pasture than agriculture.

Oviedo y Valdez (ō-vi-ā'dō ē vāl-deth'), GONZALO FERNANDEZ DE, a Spanish historian, born in 1478, and brought up as a page at the court of Ferdinand and Isabella. In 1514 he received a government appointment in the newly-discovered island of Hispaniola, and with few intervals spent the rest of his life there. Named by Charles V historiographer of the Indies, he wrote his *Historia General y Natural de las Indias Occidentales*. This and his *Quinquagenas* are two works of great historical value. He died at Valladolid in 1557.

Oviparous (ō-vip'a-rus), a term applied to those animals which produce ova or eggs from which the young are afterwards hatched. Where the eggs—as in some lizards, some snakes, or as in the land salamanders—are retained within the body of the parent until such time as the young escape from them, the animals are said to be *ovo-viviparous*.

Ovipositor (ō-vi-pos'i-tur), an appendage attached to the abdominal segments of certain insects, and used for placing the eggs in situations favorable to their due development, this being sometimes in bark or leaves, or even in the bodies of other animals. The sting of bees, wasps, etc., is a modification of an ovipositor or analogous structure.

Ovolo (ō'vu-lō), in architecture, a convex moulding, generally a quarter of a circle; but in classic architecture there is usually a departure from the exact circular form to that of an egg; hence the name (L. *ovum*, an egg).

Ovo-viviparous. See *Oviparous*.

Ovule (ō'vūl), in botany, a rudimentary seed which requires to be fertilized by pollen before it develops. It is composed of two sacs, one within another, which are called primine and secundine sacs, and of a nucleus within the sacs. At one point, the *chalaza*, the nucleus, and the two coats come into contact, and here there is a minute orifice called the *foramen* or *micropyle*. See *Botany*.

Ovum (ō'vum), the 'egg' or essential product of the female reproductive system, which, after impregnation by contact with the semen or essential fluid of the male, is capable of developing into a new and independent being. The essential parts to be recognized in the structure of every true ovum or egg consist, firstly, of an outer membrane known as the *vitelline membrane*. Within this is contained the *vitellus* or *yolk*, and imbedded in the yolk-mass the *germinal vesicle* and smaller *germinal spot* are seen. See *Ovary, Reproduction*.

Owatonna (ō-wā-ton'nā), a city, county seat of Steele County, Minnesota, on Straight River, 70 miles S. of Minneapolis. It has nurseries, flour mills, and various manufactures and is an important agricultural trade center. Here is a valuable mineral spring. Pop. (1920) 7252.

Owego (o-wē'gō), county seat of Tioga Co., New York, at junction of Susquehanna River and Owego Creek, 21 miles W. of Binghamton. In 1779 an Indian village on the site of Owego was destroyed by General Clinton. It has various manufacturing industries. Pop. (1920) 4147.

Owen (ō'en), JOHN, English Nonconformist divine, born at Stadham, Oxfordshire, in 1616, studied at Oxford, and on the breaking out of the Civil war took part with the Parliament. He adopted the Independent mode of church government. He was appointed to preach at Whitehall the day after the execution of Charles I; accompanied Cromwell in his expeditions both to Ireland and Scotland; in 1651 was made dean of Christ Church College, Oxford, and in 1652 was nominated by Cromwell, then chancellor of the university, his vice-chancellor, offices of which he was deprived in 1657. He died in 1683. Owen was a man of great learning and piety, of high Calvinistic views, and the author of numerous works.

Owen, SIR RICHARD, comparative anatomist and palæontologist, was born at Lancaster, England, in 1804, and educated in the Lancaster schools and the medical schools of Edinburgh, Paris and London. Having settled in the metropolis, he became assistant curator of the Hunterian Museum. In 1834 he was appointed professor of comparative anatomy at St. Bartholomew's Hospital; in 1836 professor in anatomy and physiology at the Royal College of Surgeons, and in 1856 superintendent of the natural history department in the British Museum, from which last post he retired in 1883. Owen was regarded as having been the greatest

palæontologist after Cuvier, and as a comparative anatomist a worthy successor to Hunter. He was a voluminous writer on his special subjects, and an honorary fellow of nearly every learned society of Europe and America. Among his works are *Lectures on the Comparative Anatomy of the Invertebrate Animals; Lectures on the Comparative Anatomy of the Vertebrate Animals; History of British Fossil Mammals and Birds; History of British Fossil Reptiles; Principles of Comparative Osteology; On the Anatomy of Vertebrates; The Fossil Reptiles of South Africa; The Fossil Mammals of Australia*, etc. He died in 1892.

Sir Richard Owen.

Owen, ROBERT, philanthropist and social theorist, born at Newtown, Montgomeryshire, North Wales, in 1771; died there in 1858. Early distinguished by his business talents, at the age of eighteen he became manager of a spinning mill at Chorlton, near Manchester, and subsequently of the New Lanark cotton mills, belonging to Mr. Dale, a wealthy Glasgow manufacturer, whose daughter he married. Here Owen introduced many important reforms, having for their object the improvement of the condition of the laborers in his employ. In 1812 he published *New Views of Society, or Essays upon the Formation of Human Character;* and subsequently a *Book of the New Moral World*, in which he completely developed his socialistic views, insisting upon an absolute equality among men. He had three opportunities of setting up social communities on his own plan—one at New Harmony in America, another at Orbiston in Lanarkshire, and the last in 1844, at Harmony Hall in Hampshire, all of which proved signal failures. In his later years Mr. Owen became a firm believer in Spiritualism. His eldest son, Robert Dale Owen (1801-77), for a time resident minister of the United States at Naples, is chiefly known as an exponent of spiritualism, on which subject he wrote several works. Another son, David Dale Owen (1807-60), acquired reputation as a geologist.

Owensboro (ō'enz-bur-ō), a city, county seat of Daviess Co., Kentucky, on the Ohio River, 114 miles s. w. of Louisville, on the Louisville & Nashville and other railroads. It ranks second in the State in the number of industries, chief of which is tobacco. Pop. (1910) 16,011; (1920) 17,424.

Owens College (ō'enz), Manchester, was established under the will of John Owens, a Manchester merchant, who died in 1846, and left about £100,000 for the purpose of founding an institution for providing a university education, in which theological and religious subjects should form no part of the instruction given. Teaching commenced in 1851, and the present handsome Gothic building for the accommodation of the college was completed in 1873. The increasing success of the college led to the establishment of a new university, Victoria University, to consist of Owens College and several towns, but having its headquarters in Manchester. The Victoria University was instituted by royal charter in 1880, with power to grant degrees in arts, science and law, a supplemental charter, granted May, 1883, giving power to grant degrees in medicine. University College, Liverpool, was incorporated with Victoria University in 1884, and the Yorkshire College, Leeds, in 1888. There is a women's department in connection with Owens College, the classes being held in separate buildings. The charter of Victoria University gives power to grant degrees to women, and the examinations are thrown open to them.

Owen Sound, a city and port of Ontario, Canada, on Georgia Bay, at mouth of Sydenham River. It has a fine, well-protected harbor. Besides being a popular resort it has varied industries, including saw mills, foundries, farm implements, mill machinery, turbine water wheels, and other manufactories. Pop. (1911) 12,558; (1921) 12,190.

Owhyhee (ō-wī'hē), the same as Hawaii.

Owlglass or HOWLEGLASS. See *Eulenspiegel.*

Owl-Parrot (*Strigops habroptilus*), the type and only known

representative of a peculiar group of the parrot family, is a large bird, a native of the South Pacific Islands, and especially of New Zealand. In aspect and in nocturnal habits it resembles the owl. It feeds on roots, which it digs out of the earth with its hooked beak. It seldom flies; it is generally to be seen resting in hollow stumps and logs, and is said to hibernate in caves.

Owls (oulz), a group of birds forming a well defined family (Strigidæ), which in itself represents the Nocturnal Section of the order of Raptores or Birds of Prey. The head is large and well covered with feathers, part of which are generally arranged around the eyes in circular discs, and in some species form horn-like tufts on the upper surface of the head. The beak is short, strongly curved and hooked. The ears are generally of large size, prominent, and in many cases provided with a kind of fleshy valve or lid, and their sense of hearing is exceedingly acute. The eyes are very prominent and full, and project forwards, the pupils being especially well developed —a structure enabling the owls to see well at dusk or in the dark. The plumage is of soft downy character, rendering their flight almost noiseless. The tarsi are feathered, generally to the very base of the claws, but some forms, especially those of fish-catching habits, have the toes and even the tarsi bare. The toes are arranged three forwards and one backwards; but the outer toe can be turned

Barn-owl (*Strix flammea*).

backwards at will, and the feet thus converted into hand-like or prehensile organs. In habits most species of owls are nocturnal, flying about during the night, and preying upon the smaller quadrupeds, nocturnal insects, and upon the smaller birds. Mice in particular form a large part of their food. During the day they inhabit the crevices of rocks, the nooks and crannies of old or ruined buildings, or the hollows of trees; and in these situations the nests are constructed. They vary greatly in size, the smallest not being larger than a thrush. In their distribution, the owls occur very generally over the habitable globe, both worlds possessing typical representatives of the

Long-eared Owl (*Asio otus*).

group. The common white or barn owl (*Strix flammea*) is the owl which has the greatest geographical range, inhabiting almost every country in the world. The genus *Asio* contains the so-called horned owls, distinguished by elongated horn-like tufts of feathers on the head. The long-eared owl (*Asio otus* or *Otus vulgaris*) appears to be common to both Europe and America. It inhabits woods. The short-eared owl (*Asio accipitrinus* or *Otus brachyotus*) frequents heaths, moors, and the open country generally to the exclusion of woods. It has an enormous geographical range. The eagle owl (*Bubo ignavus*) occurs in Norway, Sweden and Lapland, and over the continent of Europe to the Mediterranean. A similar species (*B. Virginianus*) extends over the whole of North America. Owls of diurnal habits are the hawk owl (*Surnia*) and the snowy owl (*Nyctea*). The hawk owl mostly inhabits the Arctic regions, but migrates southwards in winter, as does the snowy owl, which is remarkable for its large size and snowy plumage. The little owl (*Carine noctua*), the bird of Pallas Athena, is spread throughout the greater part of Europe. One of the most remarkable of owls is the burrowing owl (*Athena cunicularia*) of the United States and the West Indies, which inhabits the burrows of the marmots (which see), or prairie-dogs.

Owosso (ō-wos'sō), a city of Shiawassee County, Michigan, on Shiawassee River, 78 miles N. W. of Detroit. It is the trade center of a wide farming region, with extensive sugar-beat interests

and varied manufactures, including furniture, caskets, screen doors, etc. Pop. (1910) 9639; (1920) 12,575.

Ox (oks), the general name of certain well-known ruminant quadrupeds, subfamily Bovidæ (Cavicornia). The characters are: the horns are hollow, supported on a bony core, and curved outward in the form of crescents; there are eight incisor teeth in the under jaw, but none in the upper; there are no canines or dog-teeth; the naked muffle is broad. The species are *Bos Taurus*, or common ox; *B. Urus*, aurochs, or bison of Europe; *B. Bison*, or buffalo of North America; *B. Bubalus*, or proper buffalo of the eastern continent; *B. caffer*, or Cape buffalo; *B. grunniens*, or yak of Thibet, etc. (See *Bison*, *Buffalo*, *Yak*, etc.) The common ox is one of the most valuable of our domestic animals. Its flesh is the principal article of animal food; and there is scarcely any part of the animal that is not useful to mankind; the skin, the horns, the bones, the blood, the hair, and the very refuse of all these, have their separate uses. Having been specially domesticated by man from a stock which it is probably impossible to trace, the result has been the formation of very many breeds, races, or permanent varieties, some of which are valued for their flesh and hides, some for the richness and abundance of their milk, while others are in great repute both for beef and milk. The name ox is used also in a more restricted sense to signify the male of the bovine genus (*Bos Taurus*) castrated, and full-grown, or nearly so. The young castrated male is called a *steer*. He is called an *ox-calf* or *bull-calf* until he is a year old, and a *steer* until he is four years old. The same animal not castrated is called a *bull*. Besides the European ox there are several other varieties, as the Indian or zebu, with a hump on its back, the Abyssinian, Madagascar and South African.

Oxalic Acid (oks-al'ik), an acid which occurs, combined sometimes with potassium or sodium, at other times with calcium, in wood-sorrel (*Oxălis Acetosella*) and other plants; and also in the animal body, especially in urine, in urinary deposits, and in calculi. Many processes of oxidation of organic bodies produce this substance. Thus sugar, starch, cellulose, etc., yield oxalic acid when fused with caustic potash, or when treated with strong nitric acid. Saw-dust is very much used for producing the acid. Oxalic acid has the formula $C_2H_2O_4$; it is a solid substance, which crystallizes in four-sided prisms, the sides of which are alternately broad and narrow, and the summits dihedral. They are efflorescent in dry air, but attract a little humidity if it be damp. They are soluble in water, and their acidity is so great that, when dissolved in 3600 times their weight of water, the solution reddens litmus paper, and is perceptibly acid to the taste. Oxalic acid is used chiefly as a discharging agent in certain styles of calico printing, for whitening leather, as in boot-tops, and for removing ink and iron mould from wood and linen. It is a violent poison. *Oxalates* are compounds of oxalic acid with bases; one of them, binoxalate of potash, is well known as salts of sorrel, or salts of lemon.

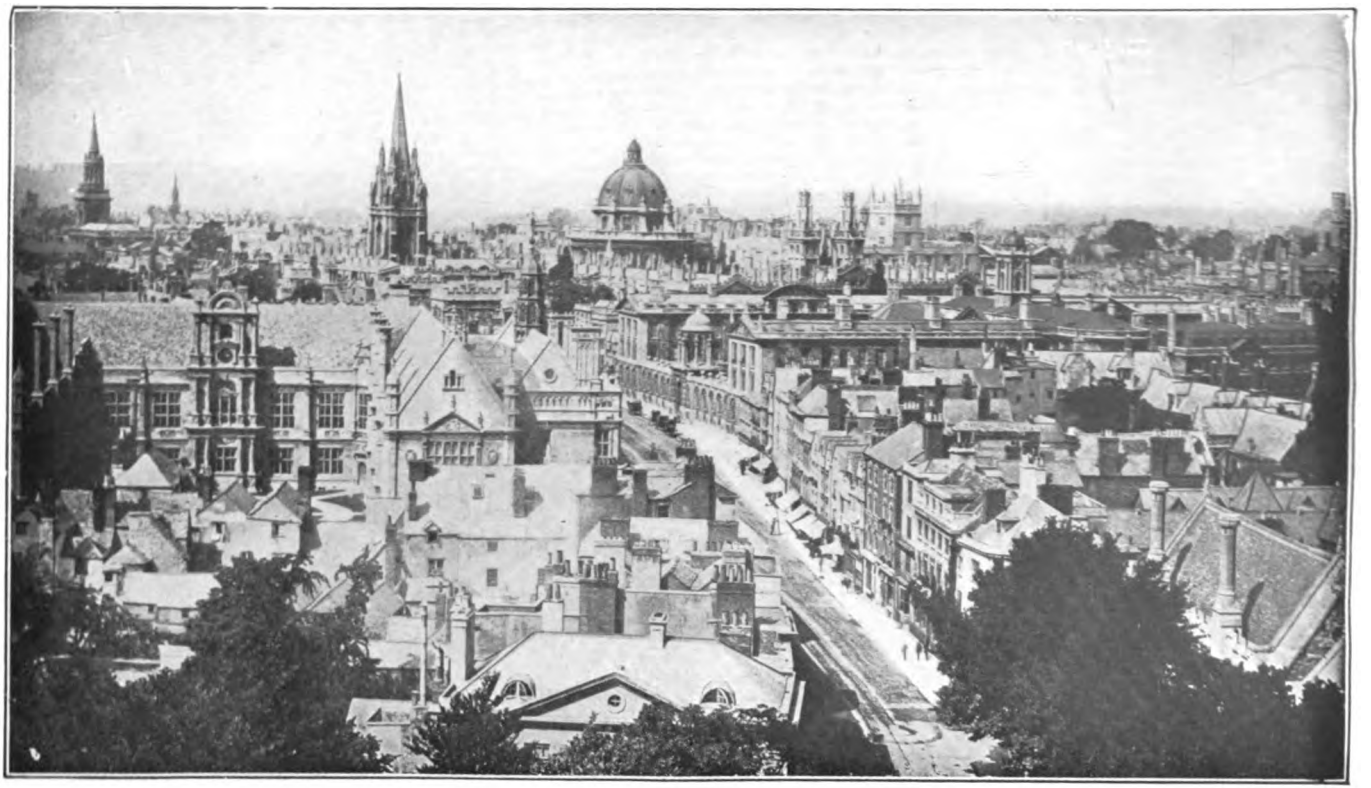
Oxalidaceæ (oks-al-i-dā'se-ē), a nat. order of polypetalous exogenous plants, of which the genus *Oxălis* or wood-sorrel is the type, comprising herbs, shrubs, and trees, remarkable, some of them, for the quantity of oxalic acid they contain. Some American species have tuberous edible roots. For two species see *Blimbing* and *Carambola*.

Oxaluria (oks-al-ū'ri-a), a morbid condition of the system, in which a prominent symptom is the presence of crystallized oxalate of lime in the urine.

Oxenstjerna (oks-en-shêr'na), Axel, Count, a Swedish statesman, born in 1583, studied theology at Rostock, Wittenberg and Jena; and in 1602, after visiting most of the German courts, returned to Sweden and entered the service of Charles IX. In 1608 he was admitted into the senate; and on the accession of Gustavus Adolphus, in 1611, he was made chancellor. He accompanied Gustavus Adolphus during his campaigns in Germany, taking charge of all diplomatic affairs; and on the fall of his master at Lützen (1632) he was recognized, at a congress assembled at Heilbronn, as the head of the Protestant League. This league was held together and supported solely by his influence and wisdom, and in 1636 he returned to Sweden after an absence of ten years, laid down his extraordinary powers, and took his seat in the senate as chancellor of the kingdom and one of the five guardians of the queen. In 1645 he assisted in the negotiations with Denmark at Bromesbro, and on his return was created count by Queen Christina, whose determination to abdicate the crown he strongly but unsuccessfully opposed. He died in 1654.

Ox-eye. See *Chrysanthemum*.

Oxford (oks'fêrd), a city and county borough in England, capital of



OXFORD

This beautiful English town is the seat of Oxford University, one of the oldest and most famous institutions of learning in the world.

Oxford county, and seat of one of the most celebrated universities in the world, is situated about 50 miles W. N. W. of London, on a gentle acclivity between the Cherwell and the Thames, here called the Isis. Oxford, as a city of towers and spires, of fine collegiate buildings old and new, of gardens, groves and avenues of trees, is unique in England. The oldest building is the castle keep, built in the time of William the Conqueror and still all but entire. Of the numerous churches, the first place is due to the cathedral, begun about 1160, and chiefly in the late Norman style. Of the university buildings the most remarkable are Christ's Church, the largest and grandest of all the colleges, with a fine quadrangle and other buildings, a noble avenue of trees (the Broad Walk), the cathedral serving as its chapel; Magdalen College, considered to be the most beautiful and complete of all; Balliol College, with a modern front (1867-69) and a modern Gothic chapel; Brasenose College; and New College (more than 500 years old), largely consisting of the original buildings, and especially noted for its gardens and cloisters; besides the Sheldonian Theater, a public hall of the university; the new examination schools, new museum, Bodleian Library, Radcliffe Library, and other buildings belonging to the university. (See *Oxford University.*) Oxford depends mostly on the university, and on its attractions as a place of residence. Pop. 53,049.—The county is bounded by Northampton, Warwick, Gloucester, Berks and Buckingham; area, 750 sq. miles, of which more than five-sixths are under crops or in grass. The south part of the county presents alternations of hill and dale, the former, particularly the Chiltern Hills, being beautifully varied with fine woods, tracts of arable land, and open sheep downs. The central parts are more level, and are also adorned by numerous woods. Much of the soil is well adapted for the growth of green crops and barley. The grasslands are also rich and extensive, dairy husbandry is largely practiced, and great quantities of butter are made. Manufactures are of little importance. The principal rivers are the Thames or Isis, Thame, Evenlode, Cherwell and Windrush. Pop. 199,277.

Oxford, Lord. See *Harley.*

Oxford-Clay, in geology, a bed of dark-blue or blackish clay, interposed between the Lower and Middle Oölites, so called from its being well developed in Oxfordshire. It sometimes attains a thickness of from 200 to 500 feet, and abounds in beautifully preserved fossil shells of belemnites, ammonites, etc.

Oxford University, one of the two great English universities, established in the middle ages, and situated in the city of Oxford (which see). Like Cambridge it embraces a number of colleges forming distinct corporations, of which the oldest is believed to be University College, dating from 1253, though Merton College was the first to adopt the collegiate system proper. The following list contains the name of the colleges, with the time when each was founded:—

1.	University College	1253
2.	Balliol College	1268
3.	Merton College	1274
4.	Exeter College	1314
5.	Oriel College	1326
6.	Queen's College	1340
7.	New College	1379
8.	Lincoln College	1427
9.	All Souls' College	1437
10.	Magdalen College	1458
11.	Brasenose College	1509
12.	Corpus Christi College	1516
13.	Christ Church College	1546
14.	Trinity College	1554
15.	St. John's College	1555
16.	Jesus College	1571
17.	Wadham College	1612
18.	Pembroke College	1624
19.	Worcester College	1714
20.	Keble College	1870
21.	Hertford College	1874

There are also two 'Halls,' St. Mary Hall and St. Edmund Hall, which are similar institutions, but differ from the colleges in not being corporate bodies.

Oxford University is an institution of quite the same character as that of Cambridge. (See *Cambridge, University of.*) Most of the students belong to and reside in some college (or hall), but since 1869 a certain number have been admitted without belonging to any of these institutions. The students receive most of their instruction from tutors attached to the individual colleges, and those of each college dine together in the college hall and attend the college chapel. The ordinary students are called 'commoners.' There are four terms or periods of study, known as Michaelmas, Hilary or Lent, Easter and Trinity or Act. The two latter have no interval between them, so that the terms of residence are three of about eight weeks each. The degrees conferred are those of Bachelor and Master in Arts, and Bachelor and Doctor in Music, Medicine, Civil Law and Divinity. Twelve terms of residence are required for the ordinary degree of B.A. No further residence is necessary for any degree, and no residence whatever is required for

degrees in music. Any B.A. may proceed to the degree of M.A. without further examination or exercise, in the twenty-seventh term from his matriculation, provided he has kept his name on the books of some college or hall, or upon the register of unattached students for a period of twenty-six terms. In the case of all other degrees (except honorary ones) some examination or exercise is necessary. Women were admitted to the examinations in 1884, but do not receive degrees. Three colleges for women have been established: Somerville Hall, Lady Margaret Hall and St. Hugh's Hall. Mansfield College, for the education of men for the nonconformist ministry, was established in 1888. The total number of students is about 3000. The total number of professorships, etc., in the university is about fifty. The total annual revenues are between $2,000,000 and $2,500,000. The institutions connected with the university include: the Bodleian Library (the second in the kingdom), the Ashmolean Museum, Botanic Gardens, Taylor Institution for modern languages, University Museum, Radcliffe Library, Observatory and Indian Institute. Affiliated Colleges are: St. David's College, Lampeter (1880); University College, Nottingham (1882); and Firth College, Sheffield (1886).

Oxides (oks'idz), the compounds of oxygen with one other element; thus hydrogen and oxygen from *oxide of hydrogen* or *hydrogen oxide*, oxygen and chlorine form a series of *oxides of chlorine*, oxygen and copper form *oxide of copper* or *copper oxide*, and so on. When two oxides of the same element exist, the name of that which contains the greater proportion of oxygen ends in *ic*, while the name of the oxide containing less oxygen ends in *ous;* thus we have N_2O, called *nitrous oxide*, and N_2O_3, called *nitric oxide*. If there be several oxides they may be distinguished by such prefixes as *hypo*, *per*, etc., or by the more exact prefixes *mono*, *di*, *tri*, *tetra*, etc. For the different oxides see the articles on the individual chemical elements.

Oxlip (oks'lip; *Primŭla elatior*), a kind of primrose, so called from some resemblance in the flowers to the lips of an ox, and intermediate between the primrose and cowslip.

Ox-peckers (oks'pek-ĕrs), a name for certain African birds, also known as *Beef-eaters* (which see).

Oxus, Amoo, Amoo-Daria, or Jihoon, a large river in Central Asia, which has its sources between the Thian Shan and Hindu Kush ranges in the elevated region known as the Pamir, flows w. through a broad valley and N. W. through the deserts of western Turkestan to the southern extremity of the Sea of Aral. The Oxus for a considerable distance forms the boundary between Afghanistan and Bokhara. Total course, 1300 miles.

Oxy-acetylene Flame is produced by the mixture of oxygen and acetylene gas. The highest furnace temperature, with solid fuel, is about 3000° F. The oxy-hydrogen flame gives a minimum of nearly 4000° F. The oxy-acetylene blowpipe yields a temperature of 6300° F. An envelope of hydrogen, which at the great temperature generated does not combine with the oxygen, surrounds the flame of the torch. The oxy-acetylene flame is employed for various purposes where a great heat is required, such as welding, caulking, leaks, etc. It is also extensively used for cutting metal. It has been found useful in clearing up metallic wreckage, as steel building structures, bridges, etc. It makes a clean cut of little width. See *Acetylene*.

Oxycoccus (oks-i-kok'us), a genus of plants of the natural order Vaccinaceæ, commonly known as the cranberry (which see).

Oxygen (oks'i-jen), a gas which is the most widely distributed of all the elements. Eight-ninths by weight of water, one-fourth of air, and about one-half of silica, chalk and alumina consist of oxygen. It enters into the constitution of nearly all the important rocks and minerals; it exists in the tissues and blood of animals; without it we could not live, and by its agency disintegration of the animal frame is carried on after death. All processes of respiration are carried on through the agency of oxygen, all ordinary processes of burning and of producing light are possible only in the presence of this gas. Oxygen was first isolated in 1774 by Joseph Priestley. Lavosier, the year following Priestley's discovery, put forward the opinion that the new gas was identical with the substance which exists in common air, and gave the name oxygen—from the Greek *oxys*, acid, and root *gen* to produce—because he supposed that it was present as the active constituent in all acids; modern experiments, however, prove that it is not necessary in all cases to acidity or combustion. Oxygen is invisible, inodorous, and tasteless; it is the least refractive, but the most magnetic of all the gases; it is rather heavier than air, having a specific gravity of 1.1056, referred to air as 1.00; it is soluble in water to the extent of about three volumes in 100 volumes of water at ordinary tempera-

tures. Oxygen was liquefied for the first time in 1877 by the application of intense cold and pressure; it has since then been solidified. It is possessed of very marked chemical activity, having a powerful attraction for most of the simple substances, the act of combining with which is called oxidation. Some substances when brought into contact with this gas unite with it so violently as to produce light and heat; in other cases oxidation is much more gradual, as in the rusting of metals. The presence of oxygen is, so far as we know, one of the physical conditions of life. In inspiring we receive into the lungs a supply of oxygen; this oxygen is carried by the blood to the various parts of the body, and there deposited to aid in the functions of the organs; the deoxygenated blood returns to the lungs, and again receives a fresh supply of the necessary oxygen. Trees and plants evolve oxygen, which is formed by the decomposition of the carbonic acid absorbed by the leaves from the atmosphere. This is due to the action of the sun's rays and the chlorophyll or green coloring matter of the leaves. When oxygen unites with another element the product is called an *oxide*. The oxides form a most important series of chemical compounds (see *Oxides* and the articles on the various chemical elements). The power of supporting combustion is one of the leading features of oxygen, and until the discovery of oxygen no well-founded explanation of the facts of combustion was known. Oxygen exists in another form different from that of the ordinary gas; in this form it exhibits many marked peculiarities. See *Ozone*.

Oxyhydrogen Blowpipe. See *Blowpipe*.

Oxyhydrogen Light (oksi - hī'drō-jen), or LIME-LIGHT, a brilliant light produced when a jet of mixed oxygen and hydrogen gas is ignited and directed on a solid piece of lime. It is commonly used in magic lantern exhibitions; and the two gases are kept in separate air-tight bags, or iron cylinders into which the gas is forced under very high pressure. From these receptacles tubes conduct the gases to meet in a common jet.

Oxyhydrogen Microscope, one in which the object is illuminated by means of the oxyhydrogen light, and a magnified image of it thrown on a screen.

Oxymoron (oks-i-mō'ron), in rhetoric, a figure in which an epithet of quite contrary signification is added to a word; as, cruel kindness.

Oxyrhynchus (-rin'kus), a celebrated Egyptian fish, sacred to the goddess Athor, and represented in sculptures and on coins. It was anciently embalmed.

Oxyria (ok-sir'i-a), a genus of plants of the nat. order Polygonaceæ. *O. reniformis* (mountain-sorrel) is found on the summits of the White Mountains, and north to the Arctic Sea.

Oxysalts (oks'i-sąltz), in chemistry, those salts which contain oxygen. The oxysalts form a very important series of substances; among them are included all the sulphates, nitrates, oxides, hydrates, chlorates, carbonates, borates, silicates, etc.

Oxysulphide (oks-i-sul'fīd), a compound formed by the combination of sulphur and oxygen with a metal or other element. The oxysulphides are not very numerous or important.

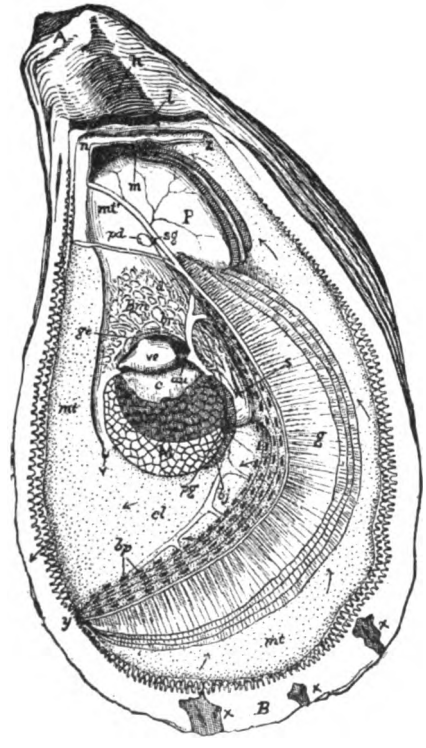
Oyama, Marquis (ō'yä-mä), a Japanese general, born about 1842. As chief-of-staff and field marshal, he was commander-in-chief in the war with Russia in 1904, and commanded in person in the latter part of that victorious campaign. He received the British Order of Merit in 1906.

Oyer and Terminer (o'yėr, tėr'minėr; Law). The name of courts of criminal jurisdiction in the United States, generally held at the same time with the Court of Quarter Sessions, and by the same judges, and which have power, as the terms imply, *to hear and determine* all treasons, felonies, and misdemeanors committed within their jurisdiction. The terms Oyer and Terminer are derived from the Old French.

Oyster (ois'tėr), an edible mollusc, one of the Lamellibranchiate Mollusca, and a near ally of the mussels, etc. It belongs to the genus *Ostræa*, family *Ostræidæ*, the members of which are distinguished by the possession of an inequivalve shell, the one half or valve being larger than the other. The shell may be free, or attached to fixed objects, or may be simply imbedded in the mud. The foot is small and rudimentary, or may be wanting. A single (adductor) muscle for closing the shell is developed. The most common American species is *Ostræa virginiana*, which is found on the Atlantic coast from the Gulf of St. Lawrence to the Gulf of Mexico. The most favorable bottom and locality for oyster-beds appear to be those situated in parts where the currents are not too strong, and where the sea-bed is shelving, and covered by mud and gravel deposits.

Ostræa edūlis is the most familiar European member of the genus. The fry or fertilized-ova of the oysters are termed 'spat,' and enormous numbers of ova are produced by each individual from May or June to September—the spawning season. The spat being discharged, each embryo is found to consist of a little body inclosed within a minute but perfectly formed shell, and possessing vibratile filaments or cilia, by which the young animal at first swims freely about, and then attaches itself to some object. In about three years it attains its full growth. The oysters congregate together in their attached state to form large submarine tracts or 'oyster-beds,' as they are termed.

The United States and France are the chief seats of the oyster industry. In the United States the natural oyster-beds are



ANATOMY OF THE OYSTER.

A. Hinge or anterior umbonal end of the left valve of an adult oyster, upon which the soft parts of the animal are represented as they lie *in situ*, but with the greater part of the mantle of the right side removed.

a u. The auricle of the right side of the heart contracted.

B. Posterior or ventral end of the left valve, which in life is usually directed upward more or less, and during the act of feeding and respiration is separated slightly from the margin of its fellow of the opposite side to admit the water for respiration, and which also contains the animal's food in suspension.

b m. Body-mass, traversed superficially by the generative ducts *g e*.

b j. The organ of Bojanus, or 'renal' organ, of the right side of the oyster. (The ducts which it sends into the mantle are not shown, nor is its connection with the genito-urinary sinus *s* indicated.)

b p. The large branchial pores which open from the subdivided cavities of the pouch-like gills *y* into the cloaca *cl*.

b r. The anterior branchiocardiac "vein," which conveys part of the blood from the gills to the auricle.

c. Right pericardiac membrane, which has been thrown back over M in order to expose the heart *ve* and *au*.

c l. Cloacal space, through which the water used on respiration passes out, and into which the excrement of the animal is discharged from the vent *v*.

d. Nervous commissure of the right side, which connects the parieto-splanchnic with the supra-œsophageal ganglion.

g. Gills, which extend as four flattened transversely, subdivided sacks from the palps *p* to the point *y*, at the edge of the mantle.

g e. Superficial network of the generative ducts as they appear when the oyster is yawning.

h. Groove in the hinge end of the left valve, which receives the ridge developed in the corresponding situation on the right one.

l. Dark brown elastic body or ligament by which the valves are held together at the hinge.

M. Great abductor muscle, which is here viewed from the end, and which is attached to the inner faces of the valves over the dark purple scars. It opposes the elastic ligament and closes the valves, and corresponds to the posterior adductor muscle of dimyary mollusks

m. Mouth.

m t. Mantle of the left side fringed with two rows of tentacles; *m t'*, portion of the mantle of the right side.

n to *s* marks the extent to which the right and left leaves of the mantle are joined together: the hood thus formed above and at the sides of the palps is called the cucullus.

P. Palps exposed, a part of the cucullus on the right being cut away.

p d. Pedal muscle of right side, which is also inserted upon the shell of the same side.

p g. Parieto-splanchnic ganglion.

s. Genital opening of the right side.

s g. Supraœsophageal ganglion.

v. Vent or anus.

v e. Ventricle of the heart, which is dilated, or in the condition of diastole

x x x. Areas at the edge of the inner surface of the shell, where intruded mud has been inclosed by a thin lamina of shelly matter deposited by the mantle.

y. Point at the posterior extremity of the gills, where the right and left leaves of the mantle are joined together by the membrane which supports the gills.

still a source of great wealth, while in Europe the native beds have long since been practically destroyed. Long Island Sound and Chesapeake Bay are leading fields in the oyster industry, and the canning and shipping of oysters an important part of the industries of Baltimore. Large quantities of American oysters are now sent to Europe; and the American are generally larger and better flavored than the European. In Europe the oyster industry is rapidly ceasing to be oyster-fishery and becoming oyster culture, and this is practiced to some extent in the United States. The most elaborate system of oyster culture is that practiced at Arcachon in France and on the island of Hayling, near Portsmouth, in England. In the breeding season the young oysters are collected upon tiles or hurdles, and laid down in artificial ponds or troughs, where they are kept until they are sent to market.

Oyster Bay, a residential town and summer resort in Nassau Co., New York, on the north shore of Long Island, 30 miles N. E. of Long Island City. It was the home of Theodore Roosevelt.

Oyster-catcher (*Hæmatopus ostralegus*), a bird belonging to the order of Grallatores or Wading Birds, nearly allied to the plovers (Charadriidæ), and popularly known as the 'sea-pie.' It is distinguished by its long, thin, wedge-shaped, orange-colored bill, and its black and white plumage. It is a permanent resident in Britain, and frequents the sea-coast, where it feeds on Mollusca.

Ozæna (ō-zē'na), a fetid ulcer in the nostril, which often follows scarlatina, or even a severe cold, but which may be a symptom of cancer or other similar disease.

Ozaka See *Osaka*.

Ozark Mountains (ō'zärk), a chain of low mountains, intersecting in a southwest direction the States of Missouri and Arkansas; height about 1400 feet.

Ozieri (ō-zē-ā'rē), a town in Sardinia, province of Sassari, the seat of a bishop. Pop. 9555.

Ozokerite (ō-zō'ke-rit), a fossil resin of a pleasantly aromatic odor, existing in the bituminous sandstones of the coal measures, and occurring chiefly in Galicia, in Austria. Small quantities of it have been found at Uphall in Linlithgowshire, and at Urpeth Colliery, Newcastle-on-Tyne, and various other places. It contains carbon and hydrogen in the proportion of 86 per cent. of the former to 14 per cent. of the latter. When purified it forms a hard paraffin, from which excellent candles are manufactured. It is used to some extent as an adulterant of bees'-wax.

Ozone (ō'zōn), a modified—technically an *allotropic*—form of oxygen. Two volumes of ozone contain three volumes of oxygen condensed to two volumes; the formula of ozone is therefore O_3. Ozone exists in small quantities in pure country air, and is produced in various ways. When an electric machine is set in operation a peculiar smell may be perceived; after a discharge of lightning the same smell is perceptible. The substance which manifests this odor is ozone (from Greek *ozō*, I smell), and in each of those cases ozone is produced. Ozone acts as a very powerful oxidizer; for this reason it is of great service in the atmosphere, as it so readily oxidizes, and thus renders comparatively unhurtful, animal effluvia and other obnoxious products of animal or vegetable decomposition. Ozone rapidly bleaches indigo, converting it into a white substance called isatin, which contains more oxygen than the indigo itself.

P

P, the sixteenth letter and twelfth consonant in the English alphabet. It is one of the mutes and labials, and represents a sound produced by closely compressing the lips till the breath is collected, and then letting it issue. See *B*.

Pabna (pub'nâ), chief town of district of same name, Bengal, on the river Ichamati; contains the usual public buildings and a large indigo factory. Pop. 18,424.—The district forms the southeast corner of the Rajshabi Division, and is bordered on the east by the Brahmaputra, and on its southwest frontier by the Ganges. Area, 1847 square miles. Pop. 1,420,461.

Paca (pâ'ka; *Cœlogĕnys*), a genus of rodents allied to the capybaras, cavies, and agoutis. The common paca (*C. paca*) is one of the largest of the rodents, being about 2 feet long and about 1 foot high. In form it is thick and clumsy, and the tail is rudimentary.

Common Paca (*Cœlogĕnys paca*).

In habits the pacas are chiefly nocturnal and herbivorous. They excavate burrows, run swiftly, and swim and dive with facility. They are found in the eastern portion of South America, from Paraguay to Surinam. The flesh is said to be savory.

Pacay (pa-kā'), a Peruvian tree (*Prosŏpis dulcis*), nat. order Leguminosæ, suborder Mimosæ. The pure white, flaky matter in which the seeds are embedded is used as food, and the pods, which are nearly two feet long, serve for feeding cattle. The mesquite (which see) belongs to the same genus.

Pace (pās), a measure of length, used as a unit for long distances. It is derived from the Latin *passus*, which was, however a different measure, the Latin *passus* being measured from the mark of the heel of one foot to the heel of the same foot when it next touched the ground, thus stretching over two steps; while the English pace is measured from heel to heel in a single step. The Latin pace was somewhat less than 5 feet; the English and American military pace at the ordinary marching rate is 2½ feet, and at double quick time 3 feet.

Pacha. See *Pasha*.

Pacheco (pâ-chā'kō), Francisco, a Spanish painter, born at Seville in 1571; died in 1654. He was the pupil of Luis Fernandez, and the instructor of Velasquez, who became his son-in-law. In his own time he attained great popularity. Of his numerous portraits those of his wife and of Cervantes were the most admired. Pacheco was the author of a treatise on the *Art of Painting*.

Pachira (pa-kī'ra), a genus of tropical American trees allied to the baobab-tree. The largest flowered species, *P. macrantha*, found in Brazil, attains a height of 100 feet, and has flowers 15 inches long. The plants are familiar in our hothouses under the name of *Carolinea*.

Pachomius (pa-kō'mi-us), a scholar of St. Antony, was the first who introduced, instead of the free hermit life, the regular association of monks living in cloisters, having founded one of them on Tabenna, an island of the Nile, about 340 A.D. He was also the founder of the first nunnery, and at his death is said to have had the oversight of above 7000 monks and nuns.

Pachuca (pâ-chö'kâ), a town of Mexico, capital of the state Hidalgo, in a rich silver-mining region, about 8200 feet above the sea. Pop. 37,487.

Pachydermata (pak-i-dĕr'ma-ta), the name formerly applied to the division or order of Mammalia, including the elephants, tapirs, hippopotamus, rhinoceros, swine, and hyrax—all of which forms were dis-

tinguished by their thick skin, by their non-ruminant habits, and by their possessing more than one hoof on each leg. The group is now divided among the various suborders of the Ungulata. See *Ungulata.*

Pachyglossæ (pak-i-glos'sē), a section of saurian reptiles having a thick, fleshy tongue, convex, with a slight nick at the end. It includes the iguanas and agamas.

Pachyrhizus (pak-i-rī'zus), a genus of tropical leguminous plants common to both hemispheres. *P. angulatus* has fleshy roots of great length and thickness, which are used in times of scarcity as an article of diet.

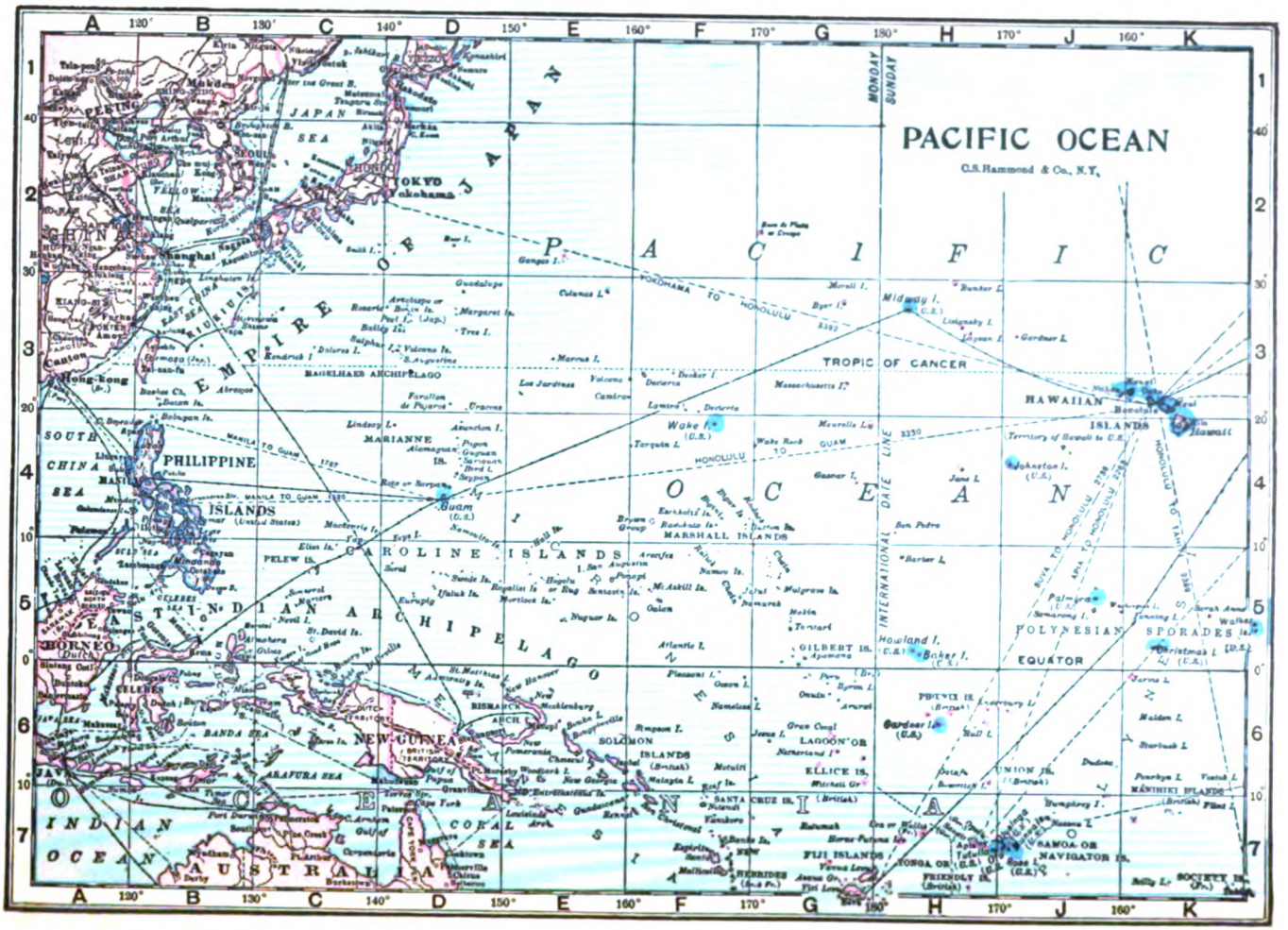
Pacific Ocean (pa-sif'ik; originally designated the *South Sea*), that immense expanse of water which extends between the North and South American continents and Asia and Australia. It is the largest of the oceans, exceeding in compass the whole of the four continents taken together, and occupying more than a fourth part of the earth's area, and fully one-half of its water surface. On the west it extends to the Indian Ocean, and has several more or less distinct seas connected with it — the China Sea, Yellow Sea, Sea of Japan, Sea of Okhotsk, etc., on the north it communicates with the Arctic Ocean by Behring Straits, on the south it is bounded by the Antarctic Ocean, and on the east it joins the Atlantic at Cape Horn. Within this enormous circumference it includes the numerous islands composing the groups of Australasia and Polynesia, and those adjoining America and Asia. The average depth of the Pacific appears to be greater than that of the Atlantic, and its bed more uniform. Recent soundings to the south of the Friendly Islands give a depth of from 4295 to 4430 fathoms (about five miles). The deepest soundings known are 4475 fathoms S. of the Ladrone Islands, and 4655 fathoms N.E. of Japan. (See *Ocean.*) In the Pacific the tides never attain the maximum heights for which some parts of the Atlantic and Indian oceans are celebrated. On all the west coast of America the rise of the tide is usually below 10 feet, and only in the Bay of Panama does it vary from 13 feet to 15 feet. The trade-winds of the Pacific are not so regular in their limits as those of the Atlantic, and this irregularity extends over a much wider region in the case of the southeast trade-wind than in the case of the northeast. The cause of this is the greater number of islands in the South Pacific Ocean, which, especially in the hot season, disturb the uniformity of atmospheric pressure by local condensations. The northeast trade-wind remains the whole year through within the northern hemisphere. The southeast trade-wind, on the other hand, advances beyond the equator, both in summer and winter, still preserving its original direction. In the region stretching from New Guinea and the Solomon Islands southeastwards, there are no regular winds. The zones of the two trade-winds are separated by regions of calms and of light winds, the limits of which vary, of course, with the varying limits of these zones. In the Chinese seas the terrible typhoon occasionally rages, and may occur at any season of the year. As to the chief currents of the Pacific, see *Currents, Marine.* The Portuguese were the first Europeans who entered the Pacific, which they did from the east. Balboa, in 1513, discovered it from the summit of the mountains which traverse the Isthmus of Darien. Magellan sailed across it from west to east in 1520–21. Drake, Tasman, Behring, Anson, Byron, Bougainville, Cook, Vancouver, Lapérouse, and others, traversed it in different directions in the seventeenth and eighteenth centuries.

Pacinian Corpuscles (pa-sin'i-an), in anatomy, minute oval bodies appended to the extremities of certain nerves, especially those of the hands and feet, probably connected with the sense of touch; named after an Italian anatomist.

Packer (pak'er), ASA, philanthropist, was born at Groton, Connecticut in 1806; died in 1879. He was the projector of the Lehigh Valley Railroad and served in the Pennsylvania Legislature and in Congress. He is best known from his liberal endowment of Lehigh University, at Bethlehem, Pa.

Packard (pak'ard), ALPHEUS SPRING, zoologist, was born at Brunswick, Maine, in 1839; died in 1905. He became an assistant surgeon in the army, a lecturer on natural history, and in 1873 professor of zoology and geology in Brown University. He was also attached to state and national scientific surveys and to the United States Entomological Commission. He wrote *Guide to the Study of Insects, Outlines of Comparative Zoology, Half-hours With Insects,* etc.

Packfong (pak'fong), a Chinese alloy of a silver-white color, consisting (though different accounts are given of its composition) of copper, zinc, nickel, and iron. It was formerly used by watchmakers, mathematical instrument makers, and others, for a variety of


PACIFIC OCEAN
C.S. Hammond & Co., N.Y.
P A C I F I C
O C E A N
EMPIRE OF JAPAN
JAPAN SEA
TOKYO
Yokohama
Shanghai
PEKING
SEOUL
CHINA SEA
EAST CHINA SEA
YELLOW SEA
Canton
Hong-Kong
SOUTH CHINA SEA
PHILIPPINE ISLANDS
MANILA
Guam (U.S.)
MARIANNE Islands
CAROLINE ISLANDS
PELEW IS.
MARSHALL ISLANDS
Wake I. (U.S.)
Midway I. (U.S.)
HAWAIIAN ISLANDS
Territory of Hawaii to U.S.
Honolulu
Johnston I. (U.S.)
Palmyra (U.S.)
Christmas I. (U.S.)
EQUATOR
TROPIC OF CANCER
INTERNATIONAL DATE LINE
MONDAY
SUNDAY
YOKOHAMA TO HONOLULU 3392
MANILA TO GUAM 1597
MANILA TO GUAM 1580
GUAM TO HONOLULU 3350
HONOLULU TO SAMOA 2228
HONOLULU TO SAMOA 2228
EAST INDIAN ARCHIPELAGO
CELEBES
BORNEO (Dutch)
JAVA
BANDA SEA
ARAFURA SEA
NEW GUINEA
BISMARCK ARCH.
NEW BRITAIN
NEW IRELAND
NEW HANOVER
SOLOMON ISLANDS (British)
SANTA CRUZ IS. (British)
NEW HEBRIDES (Anglo-Fr.)
FIJI ISLANDS
TONGA OR FRIENDLY IS. (British)
SAMOA OR NAVIGATOR IS. (U.S.)
SOCIETY IS. (Fr.)
GILBERT IS. (British)
ELLICE IS. (British)
LAGOON OR NANUMEA I.
PHOENIX IS. (British)
UNION IS. (British)
MANIHIKI ISLANDS
POLYNESIAN SPORADES
INDIAN OCEAN
CORAL SEA
AUSTRALIA
Howland I. (U.S.)
Baker I. (U.S.)
Gardner I. (U.S.)
Guam (U.S.)
Wake I. (U.S.)
Midway I. (U.S.)
Johnston I. (U.S.)
Palmyra (U.S.)
Christmas I. (U.S.)
Howland I. (U.S.)
Baker I. (U.S.)
Gardner I. (U.S.)

purposes for which nickel alloys are now employed.

Pack-ice, in the Arctic seas, an immense assemblage of large floating pieces of ice. When the pieces are in contact the pack is said to be *closed;* when they do not touch, though very near each other, it is said to be *open.*

Paco. See *Llama.*

Pactolus (pak-tō'lus), in ancient times the name of a small river of Lydia, celebrated for its golden sand. It is now called *Sarabat.*

Pacuvius (pa-kū'vi-us), MARCUS, an ancient Roman tragic poet, born at Brundusium in 219 B.C., passed the greater part of his life at Rome, where he became famous both for his poetry and his paintings, retired to Tarentum during his last years, and died at the age of ninety in 129 B.C. Only fragments of his tragedies exist.

Padang (pä-dăng'), a town in Sumatra, capital of a residency of the same name, and seat of the Dutch government of the West Coast, is the chief market in Sumatra for coffee and copra. The town embraces a Chinese settlement and a European quarter. Pop. 37,875.

Paddle (pad'l), a kind of oar used in propelling and steering canoes and boats by a vertical motion. It is shorter and broader in the blade than the common oar, and is used without any fulcrum on the edge of the boat. The boatmen sit with their faces looking in the direction in which the boat moves, and propel the boat by dipping the blade of the paddle in the water and pushing backwards. When there is only one boatman a paddle with two blades connected by a common handle is used.

Paddlefish, the *Polyödon spatŭla,* a large fish allied to the sturgeons, so named from the elongated, broad snout with which it stirs up the soft muddy bottom in search of food. It often reaches a length of from 5 to 6 feet. The paddlefishes are exclusively North American in their distribution, being found in the Mississippi, Ohio, and other great rivers of that continent.

Paddle-wheel, in steamships one of the wheels (generally two in number, one placed on each side of the vessel) provided with boards or floats on their circumferences, and driven by the engine for the ship's propulsion through the water. On rivers liable to such obstructions as floating trees, etc., a single paddle-wheel placed at the stern of the vessel is employed. The ship is propelled by the reaction of the water upon the floats. Most power is gained when the floats are vertical, passing through the water perpendicular to the direction of greatest pressure. The paddle-wheel, formerly common, is now almost entirely confined to river-boats; in ocean-going steamers, and commonly in river boats, it has given place to the screw.

Paddy (pad'i), a Malayan word universally adopted in the East Indies for rice in the husk, whether in the field or gathered.

Padella (pä-del'ä; Italian, a frying-pan), a shallow vessel used in illuminations. A number of them are partially filled with some kind of grease, in the middle of which is placed a wick, and are then placed so as to bring out when lighted the outlines of a building.

Paderewski (pä-de-ref'skē), IGNACE JAN (1860-), a Polish pianist, composer and statesman, born in Podolia, Russian Poland. At the early age of three he began to play the piano, and was placed under the care of a teacher when he was seven years of age. In 1872 he went to Warsaw, where he learned harmony and counterpoint from Roguski, and later pursued this branch of study under Friedrich Kiel of Berlin. From 1878 to 1884 he was a teacher, afterwards adopting the career of a virtuoso, under the tutelage of Leschetizky, making his formal début in Vienna in 1887. In 1889 he made his first appearance before a Parisian audience and created a furore by his marvelous playing. In 1890 he gave his first program before a London audience, and in 1891 made the first of his many phenomenally successful visits to America. As a pianist he has had few equals. He composed an opera, *Manru,* which was produced at New York in 1902. Among his compositions for the piano, his *Minuet* is the most celebrated. Other favorites are *Legend, Melody, Tocatta, Burlesque,* and *Caprice.* He wrote a symphony, a sonata for violin and piano, and several songs. Following the European war (1914-18), when arrangements were being made to reconstruct the state of Poland, Paderewski was called upon to form a government, and the brilliant pianist became the harmonizing Premier of Poland in 1919.

Padishah (pä-di-shä'), a title assumed by the Turkish sultan and Persian shah, derived from *pad* (protector or throne), and *shah* (king, prince).

Padstow (pad'stō), a seaport in Cornwall, England, on the estuary of the Camel, 12 miles N.W. of Bodmin

it is a very ancient place, and furnished ships for the siege of Calais in 1346. Pop. (1911) 2480.

Padua (pad'ū-ȧ; Italian, *Padŏva*; Latin, *Patavium*), a city in Italy, capital of the province of the same name, 22 miles west of Venice, on a low flat on the Bacchiglione, which flows through it in several branches and is crossed by numerous bridges. The houses are lofty, the streets narrow, and several of these, as well as some of the squares, are lined with mediæval arcades. Of recent times the town has been improved by the opening up of new and the widening of old streets. The buildings most deserving of notice are the town-house or Palazzo della Ragione, an immense pile erected between 1172 and 1219, extending along the marketplace, standing upon open arches, with a lofty roof, said to be the largest in the world unsupported by pillars, and containing a large hall, adorned with mural paintings; the large mosque-like Church of St. Antonio, called Il Santo, begun about the year 1230 and finished in the following century; the Church of the Annunziata, the walls of which are covered with well-preserved paintings by Giotto, etc. The university, said to have been founded by the Emperor Frederick II in 1238, was long renowned as the chief seat of law and medicine in Italy; and very many names famous in learning and art are connected with Padua, such as Galileo, Scaliger, Tasso, Giotto, Lippo Lippi, and Donatello. Padua is the see of a bishop. Under the Romans it was a flourishing municipal town, and its history follows the course of events common to most of the cities of Italy on the decline and fall of the Roman Empire. Later it fell under the domination of Venice, whose fortunes it followed until 1866, when, with Venice, it became part of the kingdom of Italy. Pop. 96,230.—The province of Padua has an area of 854 square miles, and pop. of 434,322.

Paducah (pa-dū'kȧ), county seat of McCracken Co., Kentucky, on the Ohio, Tennessee and Cumberland rivers, 30 miles from the Mississippi, with daily steamer service on each. It is on the Illinois Central and other railroads. It exports dark type tobacco in large quantities, and has railroad shops and manufactures of forest products, flour, shoes, clothing, textiles, tobacco, etc. Second largest jobbing center in State. Pop. (1910) 22,760; (1920) 24,735.

Pæan (pē'an), in Greek, a hymn to Apollo or to other deities, or a song in praise of heroes. A pæan was sung, previous to battle, in honor of Ares (Mars), and after a victory, in praise of Apollo.

Pædobaptists. See *Baptists.*

Pæony. See *Peony.*

Pæstum (pēs'tum; Greek, *Posidonia*), an ancient Greek city of Italy, on the Gulf of Salerno. It is celebrated by the Latin poets for the fragrance of its twice-blowing roses, and its mild and balmy air. Little now remains of it but some fragments of its walls and the well-preserved ruins of two Doric temples of extreme interest. The city was settled by a Greek colony from Sybaris, B.C. 524.

Paez (pȧ-eth'), JOSÉ ANTONIO, one of the founders of South American independence, born of Indian parents near Acarigua, Venezuela, in 1790; entered the patriot army in 1810, rose to general of division in 1819, and took a leading part in the battle of Carabobo, which secured the independence of Colombia in 1821. At first he acted in concert with Bolivar, but in 1829 he placed himself at the head of the revolution which culminated in the independence of Venezuela, of which he was the first president. He died in exile at New York in 1873.

Paganini (pȧ-gȧ-nē'nē), NICCOLO, a celebrated violinist, born in 1784 at Genoa; died at Nice in 1840. His father, who had some knowledge of music, and discerned the talents of his son, put him at a very early age under the best masters (Costa, Rolla, Paer) to learn music, and particularly the violin. With this instrument his progress was so rapid that at the age of nine he was able to perform in public at Genoa. His first engagement was in 1805, at Lucca, where he found a patroness in Princess Eliza, Bonaparte's sister. In 1813 he left Lucca for Milan, and in 1828 visited Vienna. From this period his fame was world-wide. The wonder which he excited was caused not merely by the charm of his execution and his extraordinary skill, but also by his external appearance, which had something weird and even demoniacal in it. After visiting almost all the great towns of Germany he made a musical tour through France and Great Britain, realizing immense gains. His last years were spent at a villa near Parma.

Pagans (pā'ganz), the worshipers of many gods, the heathen; so called by the Christians because after Christianity had become predominant in the towns the ancient polytheistic faith still lingered in the villages (*pagi*) and country districts.

Page, THOMAS JEFFERSON, an American naval officer, born at Shelby, Virginia, January 4, 1808, died at Rome, October 26, 1899. As lieutenant-commander he was engaged, 1853-56, in explorations in the Platine region, South America. In 1861 he entered the Confederate service. Subsequently he resided in Argentine and in Italy. He was the author of *La Plata, the Argentine Republic* and *Paraguay* (1859).

Page, THOMAS NELSON, author and Ambassador, born at Oakland, Virginia, April 23, 1853. He practiced law in Richmond. He has written attractive stories of Southern life, including *Marse Chan, Santa Claus's Partner, Gordon Keith, The Old Dominion, the Negro, Bred in the Bone, Robert E. Lee, The Southerner, John Marvel, Assistant, etc.* In 1913 he was appointed United States Ambassador to Italy.

Page, WALTER HINES, American editor and ambassador, born at Cary, North Carolina, August 15, 1855. After several years of newspaper work, he became manager and then editor of the *Forum*, and later editor of the *Atlantic Monthly*. In 1899 he founded the publishing firm of Doubleday, Page & Co. and became editor of the *World's Work*. In 1913 he was appointed U. S. Ambassador to Great Britain. Died Dec. 21, 1918.

Paget (paj'et), SIR JAMES, surgeon, born at Great Yarmouth, England, in 1814; died in 1899. He was admitted into the College of Surgeons in 1836, and became Hunterian professor of surgery and president of the college (1875). He gained a high reputation as a surgeon and physiologist, and published *Lectures on Clinical Pathology, Clinical Lectures*, etc.

Paget, VIOLET, writer, born in England in 1856; resided for many years in Italy. Under the pen-name of Vernon Lee she published *Studies of the Eighteenth Century in Italy, Miss Brown, Hauntings, Renaissance Fancies and Studies*, etc.

Pago (pä'gō), an Austrian island in the Adriatic, on the coast of Dalmatia; area, 81 sq. miles. Pop. 7463.

Pagoda (pa-gō'da), the name given to Hindu and Buddhist temples. The temple proper is generally of pyramidal form, and of a number of stories, of great size and height, and embellished with extraordinary splendor. Connected with it may be various other structures, open courts, etc., the whole forming architecturally a very imposing group. Pagodas are numerous not only in Hindustan, but also in Burmah, Siam, and China. The statues in the temples are often of a colossal size.

Pagoda of Mohamalaipur.

Great Pagoda at Bhuvaneswar, Orissa, India.

Pago Pago, a harbor in the island of Tutuila, Samoa. One of the best harbors in the Pacific, it was ceded to the United States in 1872, and occupied in 1898 as a coaling and supply station. In the subsequent division of the Samoan Islands between Germany and the United States, Tutuila fell to the share of the latter.

Paguma (pa-gū'ma), a group of mammals, genus *Paradoxūrus*, family Viverridæ (civets and genets)

inhabiting Eastern Asia. The peculiar masked paguma (*P. larvātus*) has a white streak down the forehead and nose, and a white circle round the eyes, which give it the appearance of wearing an artificial mask.

Pagurus (pa-gū'rus), the genus of Crustaceans to which the hermit or soldier-crabs belong. See *Hermit-crab.*

Pahang (pä-häng'), a state on the east coast of the Malay Peninsula; area, 3500 sq. m.; pop. 20,000. By the treaty concluded between Great Britain and the Sultan of Pahang in 1888 the control of the foreign relations of that state was conveyed to the government of the Straits Settlements; and Pahang is now practically a dependency of that colony. It produces gold, lead, tin, gutta percha, rattans and dammar.

Pahlanpur (pä-lan-pör'), or PALAUPUR, a town of Bombay, British India, 80 miles N. W. of Ahmedabad. Pop. about 20,000.

Pahlavi. See *Persia, Language and Literature.*

Paignton (pān'tun), a coast town in Devon, England, on Tor Bay, 2 miles S. of Torquay, is a rapidly-growing watering-place, and has large manufactures of cider. Pop. 11,241.

Pain (pān), a distressing sensation of the body, resulting from particular impressions made on the extremities of the nerves and transmitted to the brain. Physical pain may be produced by various causes — by injuries to the organs in which the pain is localized; by a peculiar state of the brain and nerves; or by the sympathetic affection of an organ at some distance from that which has been injured. It is often of great service in aiding the physician at arriving at a correct diagnosis of a disease, and still more obviously in frequently being the only intimation which a patient has of the fact of there being a disease which demands a remedy.

Paine (pān), ROBERT TREAT, statesman, was born at Boston, Massachusetts, in 1731. He was a delegate to the Provincial and Continental congresses and a signer of the Declaration of Independence. He held the offices of attorney general of Massachusetts and judge of the Supreme Court of that state, displaying fine ability as a judge. He died in 1814.— His son, of the same name (1773–1811), engaged in literary pursuits and is best known for his two patriotic songs. *Rise, Columbia,* and *Adams and Liberty.*

Paine, ROBERT TREAT, fourth in descent from the above, was born at Boston in 1835; died in 1910. He became known as an active philanthropist, organizing workingmen's associations of various kinds, and being made president, in 1907, of the Associated Charities of Boston. He was also interested in Peace, Children's Aid, and other societies, and created and endowed a trust for charitable purposes, named the Robert Treat Paine Association.

Paine, THOMAS, political and deistical writer, born in 1737 at Thetford, England. In 1774 he emigrated to America, with a letter from Franklin. Paine threw himself heart and soul into the cause of the colonists, and his pamphlet entitled *Common Sense,* written to recommend the separation of the colonies from Great Britain, and his subsequent periodical called *The Crisis,* gave him, by their great effect on the public mind, a title to be considered one of the founders of American independence. In 1787 he returned to England, and in answer to Burke's *Reflections on the French Revolution* wrote his *Rights of Man.* A prosecution was commenced against him as the author of that work, but while the trial was pending he was chosen member of the national convention for the department of Calais, and, making his escape, set off for France, where his *Rights of Man* had gained him great popularity, and arrived there in September, 1792. On the trial of Louis XVI he voted against the sentence of death, proposing his imprisonment during the war and his banishment afterwards. This conduct offended the Jacobins, and towards the close of 1793 he was excluded from the convention, arrested, and committed to prison, where he lay for ten months, escaping the guillotine by an accident. Just before his confinement he had finished the first part of his work against revelation, entitled the *Age of Reason;* it was published in London and Paris in 1794, by which step he forfeited the countenance of the greater part of his American connections. He remained in France till August, 1802, when he embarked for America, where he spent the remainder of his life, occupied with financial questions and mechanical inventions. He died at New York in 1809.

Painesville (pānz'vil), a city, county seat of Lake Co., Ohio, on Grand River, 3 miles from Lake Erie, 29 miles E. N. E. of Cleveland. It has large 'soda ash' or alkali works, foundries, flour mills, etc. It is practically a Lake port. Lake Erie College (for women) is here. Pop. (1920) 7272.

Painter's Colic. See *Lead Poisoning.*

Painting (pānt'ing) is the art of representing the external facts of and objects in nature by means of color. A study of the art requires a knowledge of form, animate and inanimate; of perspective; and of light and shade. Considered in relation to the subjects treated, painting may be divided into decorative, historical, portrait, *genre* (scenes of common or domestic life), landscape (with seascape), architectural, and still life. According to the methods employed in the practice of the art it is termed oil, water-color, fresco, tempera or distemper, and enamel painting, and in mosaics, on glass, porcelain, terra cotta, and ivory (this last being called miniature-painting). Decorative works, usually in fresco or tempera, but sometimes in oil, are generally executed upon the parts of a building. For the basis of easel pictures, wood-panels prepared with a coating of size and white were used solely up to the 14th century for both oil and tempera, and are still sparingly employed; but canvas covered with a priming of size and white lead, and tightly nailed over a wooden frame called a 'stretcher,' is now almost universally adopted for oil-painting. For water-colors paper alone is employed. The tools used by an artist are charcoal, colored crayons, and lead pencils for outline purposes; colors, a palette for holding the same, a palette knife for mixing them; brushes for laying them on; and an easel with adjustable heights for holding the canvas. A wooden manikin, with movable joints, and termed a 'lay-figure,' is sometimes used on which to arrange costumes and draperies.

The term 'oil-colors' is employed to denominate colors ground with oil, and water-colors those wherein gum and glycerine have been employed. Both are ground solid, an oil medium being used in the first case and water in the second to thin out the colors when on the palette. Fresco-painting is executed on wet plaster. Mosaic work is formed by small cubes of colored glass, called tesseræ, fixed in cement; in tempera the colors are mixed with white; in encaustic, wax is the medium employed; and in enamel the colors are fired. Egyptian, Greek, and early Roman paintings were executed in tempera; Byzantine art found its chief expression in mosaics, though tempera panels were executed; and early Christian art, up to and partly including the 14th century, adopted this last method. The vehicle employed in mixing the colors was a mixture of gum and white of egg, or the expressed juice of fig-tree shoots. The introduction of oil-painting was long attributed to the Van Eycks of Bruges (circa 1380–1441), but painting in oil is known to have been practiced at a much earlier period, and it is now generally held that the invention of the Van Eycks was the discovery of a drying vehicle with which to mix or thin their colors, in place of the slow-drying oil previously in use. This new vehicle was composed of a thickened linseed-oil mixed with a resinous varnish, and it was its introduction that effected so great a revolution in the art of painting. For an account of special methods of painting see articles *Fresco-painting*, *Mosaic*, *Tempera*, *Encaustic*, *Enameling*, etc.

History — Egypt and Greece.— The practice of painting extends back to remote ages. It comes first into notice among the Egyptians in the 19th century B.C., the most flourishing period being between 1400 B.C. and 525 B.C. With them the art was the offspring of religion, and was with sculpture, from which it cannot be separated, subordinate to architecture. The productions are found chiefly on the walls of tombs and temples, but also on mummy-cases and rolls of papyrus. They consist chiefly of the representation of public events, sacrificial observances, and the affairs of everyday life. The work is purely conventional in character, and was executed according to a strict canon of rules under the supervision of the priesthood. Both outline and color were arbitrarily fixed, the figures and objects being rendered in profile and painted in perfectly pure flat tints, with no light or shade. The colors used are very simple, but the effect is often very harmonious, and with a strong sense of decorative composition. Although art is the natural product of man's mind, and cannot be assigned any particular commencement, it is nevertheless doubtless that Egyptian art slightly influenced that of Asia Minor, and strongly so that of Greece, in which country the arts attained to the highest excellence. This is proved by the testimony of historians, for no specimens of true Greek paintings save those on vases have come down to us. In Greece, as in Egypt, painting and sculpture were the handmaids of architecture, the friezes, pediments, and statues of the temples being originally colored. The more celebrated of the Greek schools of painting were at Ægina, Sicyon, Corinth, and Athens; the chief masters being Cimon, Polygnotus, and Panœnus, who lived about the fifth century B.C. Apollodorus, same century, systematized a knowledge of light and shade, while Zeuxis and Parrhasius directed their efforts to the per-

fecting of an ideal human form. Timanthes, a tragic painter, lived in the next generation; and at the time of Alexander the Great appeared Apelles (350 B.C.), the greatest of all Greek portrait painters, and Protogenes, an animal painter. With the death of these two painters decline set in, and Greek art gave itself up to the pursuit of trifling and unworthy subjects. Greek painting seems to have been, in truth of effect and in light and shade, in no way inferior to work of the present day, although perspective as a science does not seem to have been practiced.

Rome never had in ancient times an art that was indigenous, or produced a painter worthy of note. The conquest of Greece by the Romans brought an influx of Greek artists into Italy, and it was with their hands that the principal works of Roman art were produced. A number of specimens of ancient paintings have been discovered in the tombs and baths of Rome, at Pompeii, and at other places in Italy, chiefly in fresco and mosaic. Judging from these remains, which are known to have been produced when art was in a state of decadence, the ancients would seem to have possessed a great knowledge of the human figure, of animals, and of inanimate nature, and of their uses in art. Their skill as decorators has scarcely been surpassed. Their colors were used pure, with a just treatment of light and shade, and the knowledge of perspective shown is true, but limited in extent. During the first three centuries after Christ painting under the new influence of Christianity was practiced secretly in the catacombs under and around Rome. But with the establishment of Christianity by Constantine as the religion of the state, pagan art received its deathblow. Christian art was permitted to emerge, and was allowed to adorn its own churches in its own way. Mosaics, missal paintings, and a few panels are all that are left to us of this period. Notwithstanding the efforts made by several of the popes to encourage its growth by withdrawing certain limitations, especially as regards the use of the human figure, art sank lower and lower, until with the flood of barbarism which in the 7th century buried Italian civilization, the art of Christian Rome was practically extinguished.

Byzantium.— Meanwhile, with the foundation of Byzantium by Constantine in 330 A.D., a Byzantine school of art had been steadily growing up. As to style, it manifested the old Greek ideals modified by Christianity, and had reached its highest point about the time that Roman art was at its lowest. At Byzantium, art had become Christian sooner and more entirely than at Rome. Like the art of ancient Egypt, however, it had grown, under the strict influence of the priesthood, mechanical and conventional, but was yet strong enough to send artists and teachers through Southern Europe. Their works are still to be seen at Ravenna, in Rome, in Palermo, and more especially in the church of St. Mark at Venice (tenth century A.D.). All the Byzantine decorations are in mosaic, and are noteworthy for the splendor of their gilded backgrounds and for their grandeur of conception, though the figure drawing is weak, with no attempt at pure beauty. The Byzantine school was thus the immediate parent of the great schools of Italy, and of the Rhenish or old Cologne school in Germany.

Italy, Early Period.— The Italian painters could not, however, at once free themselves from the Byzantine tradition which compelled one painter to follow in the steps of his predecessor without referring to nature; and so this style was carried on in Italy by Byzantine artists and their Italian imitators up to the middle of the 13th century. The breaking through of this tradition and the great progress made by the arts in the 13th century form part of a movement which has been termed the Renaissance or Revival, the arts being no longer representative merely, as heretofore, but becoming imitative.

Three cities of Italy, namely, Siena, Pisa, and Florence, share the honors of this revival, each boasting a school and each possessing two or three great names and their consequent followers. The first regenerators were Guido of Siena, Giunta of Pisa, and Margaritone of Arezzo, whose works, though ugly and almost barbarous, yet show a departure from the stiffness of Byzantine tradition. Giovanni Cimabue, born at Florence in 1240, may, however, be said to be the father of modern painting, and was the first fairly to free himself from traditional models; his works and those of his predecessors just named forming the transition from the Byzantine to the modern manner. His appearance marks an era in history, and after him come two painters, the one at Siena and the other at Florence, in each of whom appears the power of deriving an impression direct from nature. These were Duccio di Buoninsegna (1260–1320), whose masterpiece is still at Siena, and Giotto (1266–1337), a pupil and protégé of Cimabue, and of whose works examples are still to be seen in Florence, at Assisi

and at Padua. Of these two, Giotto is by far the greater, and his immediate pupils and their successors constituted a school which exercised an influence throughout Italy. The rival school of Siena produced Simone Memmi (1284–1344), but died out owing to its exclusiveness. The works of all the artists of these two schools were executed either in fresco or in tempera, and although lacking in chiaroscuro and deficient in perspective, compensated largely for these defects by an earnestness, a devotion, and a spiritual significance which will for ever make the 14th century memorable in the history of art. No other schools worthy of note existed elsewhere in Italy during this century; neither could the Flemish or the German school be said to have had any distinct existence as such.

With the 15th century came the introduction of oil-painting, and with it an all-round improvement both in knowledge of technics and power of expression. To the earlier half of this century belong the great masters of religious art, the most noteworthy being Fra Angelico (1387–1455), who worked chiefly in Florence, and whose productions are full of the peculiar religious fervor characteristic of the painter. A knowledge of the exact sciences as applied to art gave an added impulse, and Paolo Uccelli (1396–1475) and Piero della Francesca (1415–92) divide the honor belonging to the perfecting of a system of perspective. The works of Masolino da Panicale (died 1420) show the greatest advance yet made in the direction of chiaroscuro. Masaccio (1401–28), by his knowledge of the figure and by his treatment of groups with their proper force of light and shade and relief in appropriate surroundings, became the founder of the modern style. Andrea Verrochio (1432–88), the master of Leonardo da Vinci, promoted a knowledge of anatomy, and Ghirlandajo (1449–98), the master of Michael Angelo, may also be mentioned, both as a goldsmith and as a painter. These painters all belong to the Florentine school; but other schools were coexistent, notably that of Padua founded by Squarcione (1394–1474), whose pupil was Andrea Mategna (1431–1506), an artist who takes rank among the greatest masters of painting. The Venetian school also arose under the influence of the Bellini, Giovanni (1427–1516) and his brother Gentile (1429–1507), whose works, though somewhat hard and somewhat dry in texture, yet in color anticipate the great works of their pupils. The Umbrian school produced Pietro Perugino (1446–1524), a painter of the first rank and the master of Raphael. The Neapolitan school also began to be heard of. The Italian art work of the 15th century by its unconsciousness and spiritual meaning excelled much of that which was to follow. The latter, though carried to the highest pitch of perfection, lost much of the freshness and spontaneity possessed by the art of the earlier century.

Netherlands, Early Period.— Before speaking of the 16th century it were well to look elsewhere in Europe, and especially at the Netherlands, from whence had come the invention of oil painting, which so completely revolutionized technical methods. This discovery was made by the brothers Hubert and Jan Van Eyck, of Bruges, about the commencement of the 15th century, and carried to Italy by Antonello da Messina (1445–93). The greatest follower of this school was Hans Memling (1450–99), a comparison of whose works with those of his Italian contemporaries shows an excellence of technic and a power of expression not always in favor of the southern artists. Quentin Matsys, of Antwerp, (1460–1529) should also be mentioned as belonging to this school, a school which further exercised an influence upon that of Germany, with a result apparent in the next century, and was also the means of founding a school in Holland.

Italy, Germany, 16th Century.— The work of the 16th century is centered as much upon particular men as upon schools. Though many of the painters hereafter named were born in the latter half of the 15th century, their work separates itself so distinctly from that of their predecessors that it is the custom to consider it as belonging to the latter period. The four great schools were at Florence, Rome, Parma, and Venice, and each furnished from its scholars a painter who was in himself the particular glory of his school. Heading the Florentine comes Leonardo da Vinci (1452–1519), who established himself at Milan, and was celebrated as a painter, sculptor, architect, and engineer, his chief pupil being Bernardino Luini (1470–1530). Then following no man's style, but coming as a creator, we have Michael Angelo (1475–1564), combining in himself the highest powers in architecture, sculpture, and painting. He was followed in Florence by Fra Bartolommeo (1475–1517) and Andrea del Sarto (1488–1531). The Roman school, not indigenous but a continuation of the Umbrian school before mentioned, centers itself round the third great name, that of Raphael Sanzio

(1483–1520), aptly called the prince of painters, who with his pupils and assistants, the chief among them being Giulio Romano, constitute the Roman school. Parma contains the work of Correggio (1494–1534), generally known as the head of the Lombard school, an artist unrivaled for grace, and harmony of chiaroscuro. Finally, Venice produced a school supreme in respect of color, and owing such power as it possesses entirely to the influence of the Bellini. The first name in this period is Giorgione (1476–1511); then comes Titian (1477–1576), who takes rank with the great masters of the Florentine and Roman schools; followed by Tintoretto (1512–94) and Paolo Veronese (1532–88), who with Titian stand for all that is greatest in this school. However, it further produced Jacopo Bassano (1510–92), noted as the first to introduce pure landscape into his backgrounds; and Paris Bordone (1500–71), noted for his power in coloring and brilliancy of effect. In the north the Flemish school had become rapidly Italianized, with a result best seen in the following century. In Germany the influence of the Flemish school had made itself felt, and had produced in Albert Dürer, of Nuremberg, (1471–1528) the most celebrated master of his time north of the Alps. With him are associated Lucas Cranach (1472–1553), Burgkmair (1474–1559), and Albrecht Altdorfer (1486–1538).

Italy, Holland, etc., 17th Century.— The 16th century consummates the great age of modern art, an age that might justly be said to equal any period of Greek art. With the 17th century came the decline, brought about chiefly by the slavish imitation of the great painters of the preceding period, and art was only saved from extinction by a reaction headed by the Caracci. Their school, known as the Eclectic, was founded at Bologna by Ludovico (1555–1619), Agostino (1557–1607), and Annibale (1560–1609). Their principle was to unite a direct study of nature with a study of the excellencies of the great masters. To a certain extent the object was attained, and Guido Reni (1574–1642), Albani (1578–1660), and Domenichino (1581–1641) best illustrate in their works the results arrived at. Side by side with this school grew up that of the Naturalists at Naples, founded by Caravaggio (1569–1609), and having as his pupil Spagnoletto (1588–1656), who in turn taught Salvator Rosa (1615–73). Pietro da Cortona (1596–1669), the last of the Roman school, was the opponent of the Eclectic style. With the later Venetian school, which count Canaletto (1697–1768) and Tiepolo (1693–1770) among its disciples, the art of Italy may be said to have ended. Its seed spread itself and took root in France, and especially in Flanders, where Rubens (1577–1640) had become its greatest exponent, and whose pupils Jordaens (1594–1678) and Vandyck (1599–1641) were the most noteworthy artists of this school. In Holland, however, art had acquired a distinct individuality, first in Franz Hals (1584–1642) and above all in its typical painter Rembrandt (1607–69), both portrait painters distinguished for their portrait groups; also by its landscape and *genre* painters, of which two classes of subjects this school is the great exponent. Among its landscape painters are Van de Velde, Ruysdael, Hobbema, and Cuyp; and among its *genre* painters are Gerard Dow, Breughel, Teniers, and Van Ostade. The Spanish school, which stands alone in the prevailing religious ascetic character of its productions, and which in the preceding centuries had been influenced by Flemish and Italian painters, reached its greatest epoch in this century with Velasquez (1599–1660), one of the greatest of portrait painters, Murillo (1613–80); and with these may be mentioned Zurbaran (1598–1662), and Cano (1601–67).

France, 16th–19th Century.— The effect of Italian art in France remains to be noted. The school of France, influenced at first both by Flemish and by Italian art, finally inclined to the latter, and in the reign of Francis I (1515–47) a school was established at Fontainebleau and called by that name. Leonardo da Vinci worked in France, and Primaticcio carried on the unfinished work of Rosso (died 1541). Jean Cousin (1501–89) may be called the founder of the French school as opposed to the Italianized version which began with Simon Vouet (1590–1649). The native school was, however, finally overcome by the Italian method. Nicholas Poussin (1594–1665), figure and landscape painter, one of the greatest painters France can claim; Claude Lorraine (1600–82) and Gasper Dughet or Poussin (1613–75), landscapists, are painters who, though born in France, yet worked in Italy, and stand apart from the followers of the then national style; as does also Eustache Lesueur (1617–55), sometimes called the French Raphael. This national style was coeval with the court of Louis XIV and representative of it, the chief exponents being Le Brun (1619–90), Mignard (1610–96), Du Fresnoy (1611–65), and Jouvenet (1644–1717). To

continue the history into the 18th century, with France we find a steady deterioration both in technic and morality; the latter phase commenced by Watteau and Lancret, two painters truly French, and consummated by Boucher (1704–70). Greuze (1725–1805) and Vien (1716–1809) were the first to protest against the corrupt influence of Boucher, and were the precursors of the reform, of which David (1748–1825) was the great instigator, a man whose influence made itself felt throughout Europe. He insisted upon a return to the study of the antique, and his followers number a few distinguished men, notably Gros and Guerin. Géricault (1774–1829), a pupil of Guerin, was the first to break with the extreme classicism of the school of David, and Ingres (1780–1867), Delacroix (1798–1863), Scheffer (1795–1858), and Delaroche, noted for the reality of his historical subjects and the tenderness and pathos of his sacred pictures, (1797–1856) are the most distinguished names of the more direct and romantic style initiated by him. Modern French landscape art, founded upon an impulse received from England, has had Decamps (1803–66), Rousseau (1812–67), Corot (1796–1875), and Millet (1815–75) as its chief exponents. The work of Regnault (1843–71) remarkably illustrates the tendencies of modern French painting. Bastien Lepage (1848–84), with his literal renderings of nature, strongly influences the younger British school; and Meissonier (1815–91), Gérôme (1824–1904), Bouguereau (1825–1905), Constans, and Cabanel, and Puvis de Chavannes as a decorative artist, are some of the chief members of a school which is at the present time influencing the art of the world.

Germany, Holland, etc., 19th Century. — Germany during the 18th century remained stationary in matters of art, but with the revival in France came a similar but slightly later movement in Germany, the precursors of which were Holzer (1709–40), a Tyrolese fresco painter, and Carstens (1754–98). The chief of the revivalists, however, was Overbeck (1789–1869), who, with a band of followers, founded a school at Rome in 1810, the principle animating whose work was that modern artists should only study the painters of the time preceding Raphael. Overbeck painted religious subjects, and worked both in fresco and oil. His works, while possessing fine feeling, are poor in color and weak in chiaroscuro. Chief among his pupils is Cornelius (1783–1867), one of the greatest of modern German painters, and whose work is best seen in Munich. Schadow (1789–1862) was a pupil of Cornelius. Schnorr von Carolsfeld (1794–1872) chose for his subjects the mediæval history and myths of Germany, and also produced an extensive series of illustrations of the Bible of great merit. Kaulbach (1805–74), a great historical painter and pupil of Cornelius, shows in his work some of the worst faults of the modern German school. Lessing (1808–80) is famous both for his historical and landscape pictures, and among modern painters worthy of note are Gabriel Max and Menzel, in historical; Knaus Vautier, Metzler, and Bochmann, in genre; and Achenbach in landscape. In Dutch art of the present day the same taste but not the same power of execution prevails as in earlier times. Sea-pieces, landscapes, scenes of common life are still the chief subjects selected. Schotel and Scholfhart have distinguished themselves as landscape-painters, Van Os, Van Stry, and Ommeganck as cattle and figure painters, whilst Josef Israels, a painter of domestic scenes, with M. Maris and Mesdag, are living artists. The influence of the French school is at present paramount in Belgium, as was the classicism introduced by David up to 1830. At that time a reaction was begun by Leys (1815–69), and followed up by Wappers (1803–74), painters who selected historical subjects of national interest. The work of reformation continued to be carried on notably by Gallait and De Keyser; whilst the strong current of the present French influence may be seen in the works of the living artists Alfred Stevens and Verlat. In Italy after a long period of artificialness and mediocrity there are signs of revival in painting. Pio Joris and Cammarano have gained distinction as painters of history, and Alberto dall' Oro and Pallizzi as painters of landscape. Morbelli and Segantini show in their works some signs of a return to nature. Spain, too, with the exception of the works of Fortuny, remains unindividualistic; but a strong influence is now being exercised upon her by French art. Russian art, which had remained at a standstill since the Byzantine time, has since 1850 made great advances. It has produced Swedomsky, historical painter, Verestchagin, a traveler artist, and Kramskoĕ, a religious painter. Scandinavian art inclined for some time to the two schools of Düsseldorf and Paris, but has finally elected to follow the latter, several of her younger artists residing permanently there. Their choice is usually landscape, and among the chief names may be men-

tioned Normann Uhde and Edelfeldt. For painting in England see the article ***English Art*** and the paragraph below.

Great Britain, 18th and 19th Centuries. – The first to bring high art to England in the field of painting was Hans Holbein (1497–1534), an artist of German birth and training, though his works were principally produced in England during the reign of Henry VIII. Rubens and Vandyke, leaders in Flemish art, also did some work in England during the reign of Charles I, the latter spending all his later life in that country. There were other artists of note in the island kingdom during this early period, but for the development of a distinctive English school of painting we must come down to Sir Joshua Reynolds (1723–92), who is looked upon as the founder of the English school, and eminent as a colorist, excelling in portraiture. Gainsborough (1727–88), his contemporary, nearly approached him in portraits, and much excelled him in landscapes, being in this field an artist of great skill and excellence. Another eminent painter of this period was Hogarth (1697–1764), whose works were powerful satires on the manners, morals, and follies of the age. Among the contemporaries of these artists may be named Fuseli, the 'Dante' of painters; Wilson, eminent in landscapes; Romnie and Opie, able delineators of woman's beauty, and Barry, famous for his historical subjects. The nineteenth century yielded a prolific harvest of painters, the first to achieve fame being Sir Thomas Lawrence (1769–1830), highly distinguished for his rare delineation of female faces. Rivals of his in this field were Hoppner, Jackson, and Raeburn. Sir David Wilkie (1785–1841), a Scotch painter, has never been surpassed in Britain in his delineations of humble life. In poetic landscape Turner (1775–1851) stands first, his works being of the highest excellence in their particular field. Constable (1776–1837) was also distinguished in landscape, and among the others of this period may be named Haydon, an historical painter of high merit; Etty, a splendid colorist; Calcott, Collins, Nasmyth, and Morland. *Genre* painting was cultivated by Birk, Stothard, and others, succeeded at a later date by Newton, Leslie, Cooper, Madise, Eastlake, Hamilton, Cope, Dyce, Landseer, Frith, Faed, etc., most of these also painting landscape and historical subjects. Landscape was also cultivated by Baddington, Linnell, Roberts, etc. Lance won fame for his pictures of still life, Stanfield for his splendid sea pieces, Landseer, Audsell, and Herring for animal subjects, and many others in special fields. An interesting feature of the period was the development of a new school of art, called the *Pre-Raphaelite*, its leading representatives being Holman Hunt, Dante G. Rossetti, John E. Millais, and Burne-Jones. These are only a few of leading position among the multitude who have produced creditable works of art in the British school. To the names given we may add those of Hall, Herkimer, Leighton, Poynter, Forbes, Lawson, Fildes, Parsons, and Moore.

In the United States painting had but slow development until a comparatively recent date. The troublous times of colonial settlement and the Revolution were not conducive to art culture, although even then America had produced artists of merit — Benjamin West (1738–1820), who was made president of the Royal Academy of England; Copley (1737–1815), of high rank as portrait painter; Stuart (1756–1828), also ranking high in portraiture; Leslie (1794–1859), *genre* painter; Trumbull (1756–1843), historical; and Allston (1779–1843), the first really distinctive American artist. Thomas Cole (1801–48) originated the American school of landscape painting; his pictures are lovely and loving reproductions of nature; his worthy follower was Thomas Doughty. Others of this period were Inman, the first successful American master of *genre*, and Durand, who excelled in landscape, while Jarvis and Sully were noted portrait painters, and Vanderlyn ably painted historical subjects. Coming to a later date, we can mention only a few of the leaders in art. In the fields of history and *genre* may be found Rothermel, Page, Johnson, Homer, Leutze, Weir, May, Powell, Darley, Lambdin, Hennessey, Freeman, La Farge, Elihu Vedder, Huntington, and Reid; in marine subjects, Bradford, Dana, De Haas, Dix, Hamilton, Haseltine, Moran; landscape has Church, Bierstadt, Kensett, Inness, Hart, Cropsey, Casilear, Gignoux, Wyant, the Giffords, Cranch, Griswold, Bristol, Brown, Fitch, Richards, etc. In portrait painting Whistler and Sargent attained world fame, and Abbey, though chiefly celebrated as an illustrator, has executed some remarkable works in color. In the field of landscape painting modern artists have made notable progress.

Paisiello (pa-i-si-el'lō), GIOVANNI, an Italian singer and musician, born in 1741. In 1763 his first opera (*La Pupilla*) was performed with great applause at Bologna. By the year 1776 he had composed nearly fifty operas. In Russia he composed his best produc

tions, *La Serva Padrona* and *Il Barbiere di Seviglia*, and in Vienna *Il Rè Teodoro*, and twelve symphonies for the Emperor Joseph II. He died in 1816.

Paisley (pāz'li), a burgh of Scotland, in the county of Renfrew, 7 miles w. s. w. of Glasgow. It consists of an old town on the west or left, and a new town on the east or right bank of the river, communicating by three handsome bridges. The most noteworthy building is the Abbey Church, now a parish church, belonging to a monastery (of which little else now remains) founded in 1163 by Walter, son of Alan, the first of the house of the Stewarts, and at one time a very opulent foundation. In St. Mirren's Chapel or the Sounding Aisle, on the south side, stands a tomb supposed to have been built in honor of Bruce's daughter Marjory. Paisley has been long noted for its manufactures, especially of textile goods. The shawl manufacture, introduced about the beginning of the 19th century, and long a flourishing industry, is not now a staple, but the textile manufacture is still large, and to it has been added that of sewing cotton, for which Paisley is celebrated all over the world. Wilson the ornithologist, the poet Tannahill, and Prof. Wilson (Christopher North) were natives of Paisley, which possesses a bronze statue of the ornithologist and of the poet. Paisley is a town of ancient origin, having been at one time a Roman station under the name of *Vanduara*. Pop. 84,445.

Pajamas (pa-ja'maz), loose trousers worn by both sexes in India, a modification of which is now largely used for chamber wear in America and Europe.

Paladin (pal'a-din), a term originally applied to the *Comes palatii*, Count of the Palace, or Count Palatine, the official who superintended the household of the Carlovingian sovereigns, and then to the companions in arms of Charlemagne, who belonged to his court. Latterly it was used in a more general sense.

Palæarctic Region (pa-lē-ark'-tik), in zoology, one of six divisions of the world based upon their characteristic fauna. It embraces Europe, Northern Asia, and Africa north of the Atlas range.

Palæichthyes (pa-lē-ik'thi-ēz), a division of fishes comprising the Ganoidei and the Elasmobranchii.

Palæography (pa-lē-og'ra-fi; Gr. *palaios*, ancient, and *graphē*, writing) is the science by means of which ancient inscriptions, and the writings and figures on ancient monuments, are deciphered and explained; as distinguished from *diplomatics*, which deals with written documents.

Palæologi (pa-lē-ol'ō-ji), the name of the sovereigns of the last dynasty of the Byzantine Empire. The founder of the dynasty was Michael Palæologus, who in 1260 became Emperor of Nicæa, and in 1261 Emperor of Byzantium. See *Byzantine Empire*.

Palæontology (pa-lē-on-tol'ō-ji; Greek, *palaios*, ancient; *onta*, beings) is the science which treats of the living beings, whether animal or vegetable, that have inhabited the globe in the successive periods of its past history. The comparison of the fossil remains of plants and animals, belonging for the most part to extinct species, has given a powerful impulse to the science of comparative anatomy, and through it a truer insight has been obtained into the natural arrangement and subdivision of the classes of animals. But the science which has profited in the highest degree from palæontology is geology. Palæontology, apart from its importance as treating of the past life-history of the earth, assists the geologist in his determination of the chronological succession of the materials composing the earth's crust. As a general result of united geological and palæontological researches, it has been found possible to divide the entire series of stratified deposits into a number of rock-systems or formations, each of which is defined by possessing an assemblage of organic remains which are not associated in any other formation. These systems as a whole are divided into three great divisions, based on the characters of their organic remains, and thus representing three successive life periods, as follows:—*Palæozoic*, or ancient life epoch, which includes the Laurentian, Cambrian, Silurian, Devonian, Old Red Sandstone, Carboniferous, and Permian rock systems. *Mesozoic*, or middle life epoch, including the Triassic, Jurassic or Oolitic, and Cretaceous rock systems. *Cainozoic*, or recent life epoch, which comprises the Eocene, Miocene, Pliocene, and Post-tertiary rock systems. The fossil remains of the first two divisions belong almost wholly to extinct genera. The Cainozoic fossils belong largely to living genera, or genera only recently extinct. See *Geology*.

Palæotherium (pa-lē-ō-thē'ri-um), an extinct genus of Ungulate or Hoofed Quadrupeds with three toes. These animals resembled tapirs, and varied in size from a sheep to a horse. They had twenty-two teeth

[illegible] in all probability, a [illegible] or proboscis. This [illegible] type of the family Palæ-

[illegible] restored.

[illegible] as fossils in Eo- [illegible] *P. magnum* is [illegible] *Palæontology.*

[illegible] originally in [illegible] place for wrest- [illegible] for training the [illegible] in the public [illegible] a popular resort of the Pari- [illegible] royal palace, as the [illegible] original palace was [illegible] Richelieu, and by him [illegible] XIII. It was con- [illegible] in 1793, and [illegible] palace during the [illegible] the Restoration it [illegible] the Duke of Orleans, [illegible] 1848 it was again [illegible] state. In 1871 it [illegible] the Communists, but [illegible] The Théâtre [illegible] shops now form [illegible] of the Palais- [illegible] a genus [illegible] birds. *P.* [illegible] (which [illegible] town of [illegible] velli dis- [illegible] E. of [illegible] al-an- [illegible] vey- [illegible] by [illegible] in [illegible] Palanquin.

improvement of the roads have almost caused its discontinuance.

Palatals (pal'-a-talz), sounds which derive their character from the conjunction of the tongue and hard palate, as *ch* in *church.*

Palate (pal'at), the name applied to the roof of the mouth. It consists of two portions, the *hard* palate in front, the *soft* palate behind. The former is bounded above by the palatal bones, in front and at the sides by the alveolar arches and gums, being lined by mucous membrane; behind it is continuous with the soft palate. It supports the tongue in eating, speaking, and swallowing. The *soft palate* is a movable fold suspended from the posterior border of the hard palate. It consists of mucous membranes, nerves, and muscles, and forms a sort of partition between the mouth and the hinder nostrils. Its upper border is attached to the posterior margin of the hard palate; its lower border is free. The *uvula* hangs from the middle of its lower border, and on each side are two curved folds of mucous membrane called the *arches* or *pillars* of the *soft* palate. Between these on either side of the pharynx are the two glandular bodies known as *tonsils.* The upper surface of the soft palate is convex, the lower surface is concave with a median ridge, the latter pointing to the early or embryo stage of its formation, when it consists of two distinct parts. Non-union of these halves and of those of the hard palate constitutes the deformity known as *cleft palate,* often associated with harelip. Glands are abundant in the soft palate, secreting the mucus which serves to lubricate the throat during the passage of food. The soft palate [illegible] into action in swallowing, and also [illegible] speaking, being of great importance in [illegible] utterance of certain sounds. The [illegible] use of the uvula is not well

known. It is often relaxed or enlarged, causing a troublesome cough.

Palatinate (pa-lat'i-nāt: German PFALZ), a division of the old German Empire, under the rule of counts-palatine (Pfalzgrafen), consisting of two separate portions distinguished as the Upper and Lower Palatinate. The Upper or Bavarian Palatinate was bounded mainly by Bohemia and Bavaria, and its capital was Amberg. The Lower or Rhenish Palatinate lay on both sides of the Rhine, surrounded by Baden, Alsace, Lorraine, etc., its chief towns being Heidelberg and Mannheim. The counts-palatine were in possession of the Palatinate and the districts belonging to it as early as the 11th century, and were long among the most powerful princes of the German Empire. At the Peace of Westphalia (1648) the Lower Palatinate was separated from the Upper, Bavaria getting the latter, while the former now became a separate electorate of the empire, and was henceforth generally known as *the* Palatinate. By the treaties of Paris (1814–15) the Palatinate was split up; Bavaria received the largest part, and the remainder was divided between Hesse-Darmstadt and Prussia. The name Palatinate now belongs to the detached portion of Bavaria on the west of the Rhine, while the Upper Palatinate forms another portion of the monarchy. See *Bavaria*.

Palatine. See *Palatinate* and *Count Palatine*.

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Palatka (pā-lat'kā), a port and city of Florida, capital of Putnam Co., on the western bank of the St. John's River, 35 miles from the sea. It is frequented by deep-sea as well as by river steamers, and has a trade in oranges, sugar, and cotton, small fruits and vegetables, and has iron and machine works. Pop. (1920) 5103.

Palawan (pa-lä'wan), an island on the northeast of Borneo, belonging to the Philippines; area, 4576 square miles. It is mountainous, well wooded and watered, and very fertile, but unhealthy. Pop. (chiefly Malays), about 30,000.

Palay (pa-lā'), an Indian climbing plant (*Cryptostegia grandiflora*) of the nat. order Asclepiadaceæ. Its stalk-fibers, which are strong and white, are spun into a very fine yarn; and its milky juice forms a kind of caoutchouc.

Palazzolo (pa-lät'sō-lō), a city of Sicily, 28 miles west of Syracuse. Here are the ruins of the ancient city of Acrae, founded by Syracuse, 663 B.C., where [illegible] still to be seen. P[illegible]

Pale (pāl), [illegible] the first and [illegible] plest kind of ordinar[illegible] is bounded by [illegible] lines at equal [illegible] from the sides of the [illegible] cutcheon, of which [illegible] closes one-third. See [illegible] *aldry*.

Pale, THE, or the [illegible] name formerly [illegible] of Ireland which [illegible] English rule. [illegible] where the [illegible] vailed.

Paleæ (pā'[illegible] that [illegible] ceptacle of [illegible] also interior [illegible] grasses.

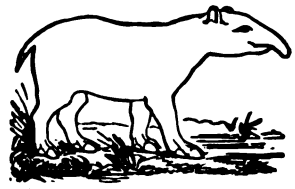
Palembang [illegible] the province of [illegible] here called [illegible] about [illegible] ing houses [illegible] ing on rafts [illegible] is one of the [illegible] ago.

Palencia [illegible] province of [illegible] Carrion, an [illegible] is a bishop [illegible] cathedral. [illegible] Palencia [illegible] Carrion and [illegible] miles; pop. [illegible]

Palenque [illegible] 60 miles N.E. [illegible] miles S.W. [illegible] tensive and [illegible] belonging [illegible] Spanish [illegible] these, called [illegible] by 180 feet [illegible] tures and [illegible]

Palermo [illegible] capital of [illegible] the north [illegible] in the form [illegible] sea, and is [illegible] is ornamented [illegible] and has many [illegible] cathedral of [illegible] tains monuments [illegible] peror Frederick [illegible] Norman. [illegible] churches of [illegible] royal palace of [illegible] ing the chapel of [illegible]

in each jaw, and, in all probability, a short mobile snout or proboscis. This genus forms the type of the family Palæotheridæ, which occur as fossils in Eocene and Miocene strata. *P. magnum* is a familiar species.



Palæotherium restored.

Palæozoic. See *Palæontology.*

Palæstra (pa-lē'stra), originally in Greece a place for wrestling, afterwards a place for training the athletes who contended in the public games.

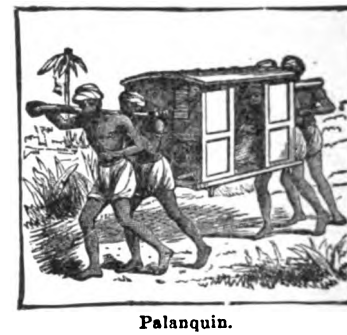
Palais-Royal (pâ-lā-rwâ-âl), a popular resort of the Parisians, originally a royal palace, as the name implies. The original palace was built (1629–36) by Richelieu, and by him presented to Louis XIII. It was confiscated by the republicans in 1793, and the Tribunal sat in the palace during the Reign of Terror. At the Restoration it was repurchased by the Duke of Orleans, but in the revolution of 1848 it was again appropriated to the state. In 1871 it was set on fire by the Communists, but has since been restored. The Théâtre Français and several shops now form parts of the buildings of the Palais-Royal.

Palamedea (pa-la-mē'de-a), a genus of S. American birds. *P. cornūta*, the horned screamer (which see), is the typical species.

Palamkotta (pä-läm-kot'tä), town of India in Tinnevelli district, Madras Presidency, 3 miles E. of Tinnevelli. Pop. 39,545.

Palanpur. See *Pahlanpur.*

Palanquin, PALANKEEN (pal-an-kēn'), a covered conveyance used in India, China, etc., borne by poles on the shoulders of men, and in which a single person is carried from place to place. The palanquin proper is a sort of box about 8 feet long, 4 feet wide, and as much in height, with wooden shutters on the Venetian-blind principle. It used to be a very common conveyance in India, especially among the Europeans, but the introduction of railways and the improvement of the roads have almost caused its discontinuance.



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Palazzolo (pa-lät'sō-lō), a city of Sicily, 28 miles west of Syracuse. Here are the ruins of the ancient city of Acrae, founded by Syracuse, 663 B.C., where curious remains are still to be seen. Pop. 14,840.

Pale (pāl), in heraldry, the first and simplest kind of ordinary. It is bounded by two vertical lines at equal distances from the sides of the escutcheon, of which it encloses one-third. See *Heraldry.*

A pale azure

Pale, THE, or the ENGLISH PALE, a name formerly given to that part of Ireland which was completely under English rule, in distinction from the parts where the old Irish laws and customs prevailed.

Paleæ (pā'le-ē), in botany, the bracts that are stationed upon the receptacle of Compositæ between the florets; also interior bracts of the flowers or grasses.

Palembang (pä-lem-bäng'), a town of Sumatra, capital of the province of same name, on the Moosi, here called the Palembang. There are about 60,000 inhabitants, partly inhabiting houses raised on posts, and partly living on rafts moored in the river. Its port is one of the best in the Malay Archipelago.

Palencia (pä-län'thē-ä), a town of Spain in Leon, capital of a province of same name, situated on the Carrion, an affluent of the Pisuerga. It is a bishop's see, and has a fine Gothic cathedral. Pop. 15,940.—The province of Palencia is fertile and watered by the Carrion and Pisuerga. Area, 3256 square miles; pop. 192,473.

Palenque (pä-len'kā), a village of Mexico, state of Chiapas, 60 miles N. E. of Ciudad Real. About 7 miles S. W. of it are some of the most extensive and magnificent ruins in America, belonging to the period anterior to the Spanish conquest. The principal of these, called the 'palace,' is 220 feet long by 180 feet wide, with numerous sculptures and hieroglyphics.

Palermo (pä-lèr'mō; ancient *Panormus*), a seaport town, the capital of Sicily, beautifully situated on the north side of the island. It is built in the form of an amphitheater facing the sea, and is surrounded by walls. The city is ornamented by numerous fountains, and has many public edifices, including a cathedral of the tenth century which contains monuments in porphyry of the Emperor Frederick II and King Roger the Norman. Other notable buildings are the churches of St. Peter and St. Dominic; a royal palace of Saracenic origin, containing the chapel of King Roger; the Cap-

cella Palatina (Palatine Chapel), built in a mixed Saracenic and Norman style, and dating prior to 1132, having the walls entirely covered with rich Byzantine mosaics on a golden ground; the picture gallery and the armory; the National Museum, containing some of the oldest monuments of Greek plastic art to which a definite date can be assigned (sixth century B. C.); the archiepiscopal palace, the custom-house, the university, three theaters, and numerous other structures of architectural interest. The port is enclosed by a mole 1300 feet in length. Palermo is the residence of the military commandant of the island, and has an arsenal and shipbuilding yards. The manufactures consist chiefly of silks, cottons, oilcloth, leather, glass, and gloves. The principal exports are sumach, wine and spirits, fruits, sulphur, skins, oil, essences, cream of tartar, liquorice, and manna; imports, colonial produce, woolen, cotton and silk tissues, hardware, earthenware, etc. The fisheries are very productive, and give employment to nearly 40,000 hands. Palermo was probably founded by the Phœnicians; it afterwards became the capital of the Carthaginian possessions in Sicily. It was taken by the Romans, 254 B.C. The Saracens held it for a time, and in 1072 it fell to the Normans. The German emperors and the French subsequently held it, and since the Sicilian Vespers (1282) it has shared the fortunes of the Sicilian kingdom. The court of Naples resided here from 1806 to 1815. Garibaldi captured the town in 1860. Pop. 345,891.—The province of Palermo contains an area of 1927 square miles. Pop. 804,581.

Pales (pā'lēz), the goddess (sometimes regarded as a god) of sheepfolds and pastures among the Romans. Her festivals, called *Palilia*, were celebrated on the same day as the anniversary of the founding of Rome.

Palestine (pal'es-tīn), CANAAN, or the HOLY LAND, long a maritime country of Turkey, in the southwest of Syria, having on the north the mountains of Lebanon and Anti-Lebanon, east the Arabian Desert, south Arabia, and west the Mediterranean; length, north to south, about 140 miles; breadth, about 80 miles; area, nearly 10,000 square miles (or one-third the size of Scotland). The coast has no indentations except the Bay of Acre in the north. The chief feature of the interior, besides its generally irregular character, is the deep valley of the Jordan, a river which intersects the country from the north to south, and connects three lakes, the Dead Sea, Lake of Gennesaret, and Lake Merom. The surface is generally mountainous, or consists of a series of plateaux both on the west and the east of the valley of the Jordan. With the exception of Mount Hermon in the north (9050 feet) few of the heights exceed 3000 feet. The most remarkable are Carmel, on the southwest side of the Bay of Acre; Jebel Tur (Tabor), farther inland; Ebal and Gerizim, about the middle of the country; Zion, Moriah, and the Mount of Olives, in and near Jerusalem. Palestine has comparatively few plains, though in few countries is there such endless variety of valley as to size, shape, color, and fertility. The maritime or coast plains of Sharon and Philistia, the river plain of Jordan, and the plain of Esdraelon in the north, are all that are worthy of mention. The maritime plains are well peopled and cultivated. The Jordan plain is nearly a waste of sand. The plain of Esdraelon or valley of Jezreel is of great fertility. The principal river is the Jordan (which see). This river has a length of 200 miles, including windings, but its direct course is only about 70. Its course from Merom to the Dead Sea is mostly below the sea-level. Most of the so-called rivers of Palestine are merely winter torrents which run dry in summer. Of the few permanent rivers emptying into the Mediterranean, the most important are the Kishon, which drains the plain of Esdraelon; and the Aujeh farther south. The chief tributary of the Jordan is the Zerka or Jabbok. The most remarkable lake is the Dead Sea (which see), 46 miles long, 9 or 10 broad, and fully 1300 feet below the Mediterranean. The other lakes are Bahr-el-Huleh (Merom), 5 miles long and 4 miles broad, about 6 feet above the Mediterranean; and Lake Gennesaret or the Sea of Galilee, 682 feet below it, 12½ miles long 7½ broad. In Palestine the wells and springs are numerous, and are all counted worthy of note. Among the most interesting are the springs of hot water which issue forth on both sides of the Jordan valley. Of these there are five or six with a temperature varying from 109° to 144° F. As regards geology, the chief rock formation of the country on both sides of the Jordan is limestone, full of caves. Sandstone also occurs, with basalt and other volcanic rocks, the latter being especially common on the east side of Jordan. Signs of volcanic action are abundant, and earthquakes are still common. The year may be divided into two seasons, summer and winter. During the former, which lasts from April to November, little or no rain falls; during the latter there is a considerable fall of rain.

the annual average at Jerusalem being about 60 inches. In the Jordan valley and along the Mediterranean lowlands the summer heat is apt to be oppressive. During the winter the ground is seldom, if ever, frozen except on the higher elevations. Palestine was once very fertile, and were the same attention paid, as formerly, to artificial irrigation, and the construction of reservoirs and watercourses, it might be so again. Among the products, besides the usual cereals, are grapes, figs, olives, oranges, and apricots. The flora of Palestine is rich in flowering plants, including the scarlet anemone, ranunculus, narcissus, crocus, pheasant's-eye, etc. The country was once well timbered, but it is now, as a whole, bare and desolate, though forests of pine and oak exist on the east of the Jordan. On the west side of the river, however, there are few trees. The most common tree is the oak, including the prickly evergreen oak and two deciduous species. Other trees are the olive, palm, oleander, sycamore, walnut, ash, cedar. The wild animals include the leopard, hyæna, bear, wolf, jackal, boar, antelope, gazelle, porcupine, coney, jerboa, etc. The domestic animals of burden are the ass, mule, and camel, the horse being little used. The cattle are not generally very numerous. Sheep and goats are abundant. Among the birds are eagles, vultures, hawks — birds of prey being very numerous — ravens, bee-eaters, hoopoes, storks, and nightingales. Fish abound in the Sea of Galilee and the Jordan. There are many species of reptiles, among them being the chamæleon, land and water tortoise, lizards, and serpents, and even the crocodile.

The name Palestine, from the Hebrew *Peleschéth*, means the land of the Philistines. It is properly only applicable to the southwest part of the country. The ancient name of the country was Canaan, and when thus named, in the time of the patriarchs, it was parceled out among a number of independent tribes, all probably Semitic. In the time of Moses the district east of the Jordan was taken and divided among the tribes of Reuben and Gad, and the half-tribe of Manasseh; and later the whole territory was apportioned among the twelve Jewish tribes. For the subsequent history see the article *Jews*. In the time of our Saviour Palestine was held by the Romans, and divided into the four provinces of Galilee, Samaria, Judea, and Perea. In 606 Palestine was taken by the Saracens under Omar. The severities exercised towards Christians gave rise to the Crusades, but Mohammedanism remained in control, and the country sank into a degraded state. The Sultan of Egypt ruled it till 1517, when it was made part of the Turkish Empire. The population of Palestine is estimated at about 750,000, of which some 340,000 are in the Sanjak (province) of Jerusalem. The Arab element predominates, but Jewish immigration is increasing. See *Zionism*.

Palestine was invaded by the British in 1917 during the European war, the advance beginning with the capture of Beersheba in the south, early in November. The city of Gaza was taken from the Turks on November 7. The port of Jaffa fell in mid-November, and General Allenby, commander of the British forces, announced on December 7 that he had definite possession of Hebron. Then began an encircling movement that enfolded on the south the little town of Bethlehem, where Christ was born. Bethlehem was captured December 7, and the Holy City was surrendered December 9. Jericho was also wrested from Turkish control, and the Jordan was crossed in May, 1918. With the defeat of Turkey and Germany and the central powers in the European war, Palestine, Mesopotamia and other sections of the Ottoman Empire were detached from Turkish control. Great Britain was given a mandate over most of Palestine. A small portion in the north, together with Beirut, was made a mandatorate of France.

Palestine, a city, county seat of Anderson Co., Texas, 160 miles N. E. of Austin. It has the shops of the International & Great Northern R. R., cottonseed-oil mills, foundries, saw and grist mills, salt works, wood-working plants, and other industries. Pop. (1910) 10,482; (1920) 11,039.

Palestrina (pä-les-trē'na; ancient *Prænestе*), a town of Central Italy, 23 miles E.S.E. of Rome. It is of Greek origin, and has numerous ancient remains, and the Barberini Palace, now deserted. Pop. 6027.

Palestrina (pä-les-trē'na), GIOVANNI PIERLUIGI (or PIETRO ALOISIO) DA, an Italian musical composer, born at Palestrina in 1524; died in 1594. In 1551 he was appointed by Pope Julius III master of a choir of boys in the Julian Chapel, and was the first to receive the title of chapel-master. In 1554 he published a first collection of masses, and Julius admitted him into the college of choristers of the pope's chapel. He was dismissed by Pope Paul IV in 1555, but in the same year he was appointed chapel-master of San Giovanni in Laterano. He held this post for six years, when he exchanged

it for a similar appointment in the church Santa Maria Maggiore, in which he continued till 1571. In the meantime the Council of Trent, on reassembling in 1562, pointed out the necessity of a reform in church music, which had become vulgar and profane. A commission was appointed, and Palestrina composed three beautiful masses which created quite a revolution in sacred composition. One of them, the *Missa Papæ Marcelli*, is still celebrated. In 1571 Palestrina was appointed chapel-master of the Basilica San Pietro in Rome. He left an extraordinary number of musical compositions.

Palette (pal'et), PAINTER'S, an oval tablet of wood, or other material, very thin and smooth, on which painters lay the various colors they intend to use, so as to have them ready for the pencil. In connection with the palette painters use a palette knife, a thin, round-pointed knife for mixing up colors. The palette contains a hole at one end in which the thumb is inserted to hold it.

Paley (pā'li), FREDERICK APTHORP, grandson of the following, was born in 1816. Educated at Shrewsbury, he went afterwards to St. John's College, Cambridge, and took his degree in 1838. In 1846 he became a Roman Catholic, and in 1874 accepted the post of professor of classical literature in the Catholic College at Kensington. He died in 1888. His best title to fame rests on the valuable work he did as editor and annotator of classical texts, especially Æschylus and Euripides.

Paley, WILLIAM, an English theological and philosophical writer, was born at Peterborough in 1743; died in 1805. In 1758 he became a sizar of Christ's College, Cambridge, where he graduated B.A. as first wrangler in 1763. In 1766 he took his degree of M.A., and became a fellow and tutor of his college. In the following year he was ordained. In 1776 he married and gave up his fellowship. In 1780 he became prebendary of Carlisle, and in 1785 chancellor of the diocese. In 1794 he was made prebendary of St. Paul's and subdean of Lincoln; and in 1795 he received the rectory of Bishop-Wearmouth. He also received in this year the degree of D.D. from Cambridge University. His chief works are: *The Principles of Moral and Political Philosophy* (1785); *Horæ Paulinæ* (1790); *A View of the Evidences of Christianity* (1794); *Natural Theology, or Evidences of the Existence and Attributes of the Deity collected from the Appearance of Nature* (1802), founded on a work by Nieuwentyt, a Dutch philosopher. As a writer he had little claim to originality, but was distinguished by clearness and cogency of reasoning, lucidity of arrangement, and force of illustration. His system of moral philosophy is founded purely on utilitarianism.

Palghat (pāl-ghāt'), a town in Malabar, Madras, India. It is a busy entrepôt for the exchange of produce between Malabar and the upland country. Pop. 44,177.

Palgrave (pal'grāv), SIR FRANCIS, was born in London in 1788. He was a Jew, and his original name was Cohen, which he changed to Palgrave on embracing Christianity in 1823. He was called to the bar in 1827, and made himself known by his edition of the *Parliamentary Writs from 1273 to 1327* (1827–34), *History of England* (1831), *Rise and Progress of the Commonwealth* (1832). In 1832 he was knighted. He served on the Municipal Corporation Commission, 1833–35, and was appointed deputy-keeper of records in 1838. He died at Hampstead in 1861. His other works include *Truths and Fictions of the Middle Ages* (1844), *Reports of the Deputy-keeper of the Public Records* (1840–61), and the *History of Normandy and England* (1851–60).

Palgrave, FRANCIS TURNER, son of the above, was born in London in 1824, and educated at Charterhouse and Baliol College, Oxford. He became a fellow of Exeter College, and was for five years vice-principal of the Schoolmaster's Training College at Kneller Hall. He then acted as private secretary to Lord Granville, and later on held a post in the Education Department. In 1886 he was elected professor of poetry at Oxford. His literary works include *Idyls and Songs* (1854), *Golden Treasury of the Best Songs and Lyrical Poems* (1861), *Sonnets and Songs of Shakspere* (1865), *Essays on Art* (1866), and *Selected Lyrical Poems of Herrick* (1877). He died in 1897.

Palgrave, WILLIAM GIFFORD, brother of the foregoing, born in London in 1826; died in 1888. He graduated at Oxford, and from 1847 to 1853 served in the Bombay Light Infantry. He then became a Roman Catholic, was ordained a priest, joined the Jesuits, and engaged in missionary labors in India and Syria. In 1862 he undertook for Napoleon III, a journey through Central and Eastern Arabia. He subsequently left the Jesuits, entered the diplomatic service, and married. He acted as British consul at various places until 1876. He was appointed consul

general in Bulgaria in 1878, in Siam in 1879, and in 1884 minister resident and consul-general in Uruguay, and his death took place at Montevideo. His literary works include *Personal Narrative of a Year's Journey through Central and Eastern Arabia* (1872); *Hermann Agha*, a story (1872); *Alkamah's Cave* (1875); and *Dutch Guiana* (1876).

Pâli (pä'lē), the sacred language of the Buddhists, as closely related to Sanskrit as Italian to Latin. It is the language in which the oldest religious, philosophical, and historical literature of Buddhism is written, and is especially the language of the sacred books of the Buddhists of Ceylon, Burmah, and Siam; but it is no longer spoken anywhere, though a corrupt form of it is to some extent used for literary purposes. The study of Pâli was introduced into Europe by Lassen and Burnouf.

Palicourea (pā-li-kö'rē-a), a genus of plants, nat. order Rubiaceæ, tropical American shrubs with small or rather large flowers in compound thyrses or corymbs. *P. officinalis* is reported to be a powerful diuretic, and *P. tinctoria* forms a fine red dye, much valued in Peru. *P. densiflöra* yields coto bark (which see).

Palimpsest (pal'imp-sest; from Greek *palin*, again, *psē-stos*, rubbed), a manuscript prepared by erasure for being written on again, especially a parchment so prepared by washing or scraping. This custom was brought about by the costliness of writing materials, and was practiced both by the Greeks and Romans, and in the monasteries, especially from the 7th to the 13th centuries. That which replaced the ancient manuscripts was nearly always some writing of an ecclesiastical character. The parchments which have been scraped are nearly indecipherable. Those which have been washed have often been revived by chemical processes. Fragments of the *Iliad* and extensive portions of many Greek and Roman writers have been recovered by these means.

Palinode (pal'i-nōd), in a general sense, a poetical recantation or declaration contrary to a former one. In Scots law it is a solemn recantation demanded in addition to damages in actions on account of slander or defamation raised in the commissary court, and even in the sheriff court.

Palisade (pal'i-sād), a fence or fortification consisting of a row of strong stakes or posts set firmly in the ground, either perpendicularly or obliquely, for the greater security of a position, and particularly for the closing up of some passage or the protection of any exposed point.

Palisander-wood (pal-i-san'dėr), a name in France for rosewood and some other woods.

Palissy (pal'i-si), BERNARD, a French artist and philosopher, born about 1510. He was apprenticed in a glassworks at Agen, where he learned the art of painting on glass. Having completed his apprenticeship, he set out on a tour of France and Germany (1528), maintaining himself by practicing his craft of glass-painter and by land-surveying. During his travels he studied attentively all the books within his reach, and acquired an extensive knowledge of natural science. In 1505 he returned to France, married, and settled at Saintes. Shortly after his return his attention was attracted by a fine specimen of enameled pottery, and he thereupon resolved to discover for himself the secret of the enamel. Being ignorant of the potter's art he had to grope his way, and labored on year after year without success, almost starving, and reducing his family to the depths of poverty. At length, after sixteen years of unremunerated labor (1538–54), he obtained a pure white enamel, affording a perfect ground for the application of decorative art. He was now able to produce works in which he represented natural objects grouped and portrayed with consummate skill, and his enameled pottery and sculptures in clay became recognized as works of art. In 1562 he went to establish himself at Paris, where he continued to work at his art, and also delivered scientific lectures, which were attended by the most distinguished men in Paris, and contained views far ahead of his time. He suffered persecution as a Huguenot, and was arrested in 1589 and thrown into the Bastille, where he is said to have died in 1590. He left several philosophical works. See next article.

Palissy-ware, a peculiar kind of French art pottery invented by Bernard Palissy. The surface is covered with a jasper-like white enamel, upon which animals, insects, and plants are represented in their natural forms and colors. Specimens of this ware are much valued and sought after by collectors.

Paliurus (pa-li-ū'rus), a genus of deciduous shrubs, natives of the south of Europe and Asia Minor, and belonging to the nat. order Rhamnaceæ. See *Christ's Thorn*.

Palk Strait (pąk), a channel between the mainland of India and the north part of Ceylon, abounding in shoals, currents, sunken rocks, and sand banks.

Pall (pąl), a covering of black velvet thrown over a coffin while being borne to burial, the ends of which in a walking procession are held by the friends of the deceased. In another sense the pall or *pallium* is an ecclesiastical vestment sent by the sovereign pontiff on their accession to patriarchs, primates, and metropolitans, and sometimes, as a mark of honor, to bishops. It is made of white lamb's wool, and consists of a narrow strip of cloth encircling the neck and shoulders, with two narrow pieces hanging down, all embroidered with crosses.

Palladian Architecture (pa-lā'-di-an), a species of Italian architecture due to Palladio (see next article), founded upon the Roman antique as interpreted by the writings of Vitruvius, but rather upon the secular buildings of the Romans than upon their temples. It is consequently more applicable to palaces and civic buildings than to churches. A characteristic feature of the style is the use of engaged columns in façades, a single range of these often running through the two principal stories. It was introduced into England by Inigo Jones, a follower of the Venetian school of Palladio.

Palladio (pa-lā'di-ō), ANDREA, one of the greatest classical architects of modern Italy, was born at Vicenza in 1518; died at Venice in 1580, where he was architect of the republic. He perfected his architectural acquirements at Rome, and on his return to Vicenza he established his fame by his designs for many noble buildings both there and in other parts of Italy. From 1560 he erected many buildings at Venice. (See preceding article.) He was the author of a *Treatise on Architecture.*

Palladium (pa-lā'di-um), a wooden image of Minerva (Pallas) which is said to have fallen from heaven and to have been preserved in Troy. The Trojans believed that their city would be invincible so long as it contained the Palladium. The Romans pretended that it was brought to Italy by Æneas, and preserved in the temples of Vesta at Rome, but several Greek cities claimed to possess it.

Palladium, a metal discovered by Wollaston in 1803, and found in small quantity associated with native gold and platinum. It presents a great general resemblance to platinum, but is harder, lighter, and more easily oxidized; symbol Pd, specific gravity about 11.5. It is useful on account of its hardness, lightness, and resistance to tarnish, in the construction of philosophical instruments.

Palladius (pa-lā'di-us), RUTILUS TANNIS ÆMELIANUS, a writer of the fourth century after Christ. He was the author of a poem on agriculture, *De Re Rustica*, in 14 books.

Pallah (pal'la), a species of antelope (*Æpyceros melampus*) found in South Africa.

Pallanza (pą-länt'są), a town of Italy beautifully situated on a promontory on the west side of Lago Maggiore. Pop. 4619.

Pallas (pal'as), of the minor planets revolving round the sun between Mars and Jupiter, that whose orbit is most inclined to the ecliptic. It was discovered in 1802 by Olbers at Bremen. It revolves round the sun in 4.61 years; diameter, 172 miles.

Pallas, PETER SIMON, traveler and naturalist, born at Berlin in 1741; died there in 1811. Becoming distinguished as a naturalist, he was sent by Catherine II, of Russia, in charge of a scientific expedition to Asiatic Russia. The results of his observations were published in his *Travels through Various Provinces of the Russian Empire* (1771–76). His other chief works are *Spicilegia Zoologica* (1767–80), *Flora Rossica* (1784–85), *Journey through Southern Russia* (1799, Eng. trans. 1812).

Pallas Athēnē (pal'as a-thē'nē), the Greek goddess of wisdom, subsequently identified with the Roman Minerva. See *Athena.*

Pallavicino (pal-a-ve-chē'nō), SFORZA, son of Marquis Alessandro Pallavicino, of Parma, was born at Rome in 1607, studied in the Roman College, and afterwards joined the Jesuits. He is famous as the historian of the Council of Trent, and stood high in the esteem of Pope Alexander VII, who made him a cardinal. He died in 1667.

Palliobranchiata (pal'-i-o-bran'ki-a-ta), the name formerly applied to the class of Brachiopodous Mollusca from the belief that the pallium or mantle lining the shell formed the chief organ of respiration.

Palliser (pal'is-ėr), SIR WILLIAM, born in Dublin in 1830. After passing through the Staff College at Sandhurst he obtained a commission in the Rifle Brigade (1855). He was subsequently transferred to the Hussars, and retired from the army in 1871. He

was the inventor of projectiles and guns which bear his name, and is the author of many improvements in fortifications, etc. He was knighted in 1873, and died in 1882.

Pallium. See *Pall.*

Pall-mall (pel-mel), an ancient game, in which a round boxwood ball was with a mallet or club struck through a ring elevated upon a pole, standing at either end of an alley, the person who could do so with fewest blows or with a number agreed on being the winner. The game was formerly practiced in St. James's Park, London, and gave its name to the street called Pall Mall.

Palm, the tree. See *Palms.*

Palma (päl'ma), an episcopal city of Spain, capital of the island of Majorca, 130 miles south of Barcelona. It is built in the form of an amphitheater, and enjoys an extremely mild and salubrious climate. The principal public buildings are the cathedral, the exchange, the governor's palace, and the town-house. There are schools of medicine and surgery, normal and nautical schools, two public libraries, and a museum. Shipbuilding yards employ numerous hands. Palma is the port of the whole island, and has an important trade. Pop. (1910) 67,544.

Palma, Jacopo, an Italian painter, called Palma Vecchio (the elder Palma), was born near Bergamo about 1480, and died in 1528. He is supposed to have been a pupil of Titian, and his later manner seems to have been modified by study of Giorgione. His work is less remarkable for draughtsmanship than for the suffused golden brilliance of its coloring. His most notable pieces are six paintings in the Church of S. Maria Formosa at Venice, and the *Three Graces* in the Dresden gallery.

Palma, La, the most northwesterly of the Canary Islands; area, 224 square miles; capital, Santa Cruz de la Palma, the principal port. It consists for the most part of elevated mountains, and in the north the coast is high and precipitous. The climate is agreeable and healthy, and the soil fertile. Besides a small quantity of grain, La Palma produces wine, fruits, sugar, honey, wax, silk, etc. Pop. 41,994.

Palma Christi, a name frequently applied to the castor-oil plant.

Palma di Montechiaro (mon-tā-kyä'rō), a town of Sicily, in the province and 14 miles E. S. E. Girgenti. It is noted for its almonds. Pop. 14,101.

Palmas (päl'mas), Cape, a headland of W. Africa, on the Guinea coast, lat. 4° 22′ 6″ N., lon. 7° 44′ 15″ W. There is a lighthouse with a fixed light, and the adjacent harbor, which is the only one between Sierra Leone and Benin, is spacious, secure, and protected by a reef from the swell of the ocean.

Palm Beach, a village, Palm Beach Co., Fla., 66 miles N. by E. of Miami, on a narrow strip of land between Lake Worth and the Atlantic coast; a fashionable winter resort. The district is semi-tropical in character, producing quantities of fruit, such as cocoanuts, guavas, etc. Pop. (winter) 5000.

Palmer (päl'mėr), in mediæval times, the name given properly to a pilgrim who had visited the Holy Land, from the circumstance that those who performed the pilgrimage to the sacred sepulcher generally carried on their return a palm branch as a memorial of their journey. The name was also given to other pilgrims.

Palmer, Edward Henry, an English Oriental scholar, born at Cambridge in 1840; graduated at St. John's College in 1867. He was a member of the survey expedition to Sinai (1868–69) and to Moab (1869–70), and on his return became professor of Arabic at Cambridge (1871). In 1882 he was killed by the Arabs in the Sinaitic peninsula. Among his numerous works are a *Persian-English Dictionary* (1876).

Palmer, a township of Hampden Co., Massachusetts, on the Chicopee River, 15 miles E. by N. of Springfield. It has manufactures of cotton, woolen, and wire goods and carpets. Pop. (1920) 9896.

Palmer (pä'mėr), Erastus Dow, sculptor, born in Onondaga county, New York, in 1817; died in 1904. Among his best works are *Indian Girl Contemplating a Crucifix*, *The White Captive*, *The Sleeping Peri*, and *Landing of the Pilgrims.*

Palmerston (päl'mėr-stun), Henry John Temple, Viscount, an English statesman, was born in Westminister in 1784; died in 1865. He was educated at Harrow, Edinburgh University, and St. John's College, Cambridge. In 1802 he succeeded his father in the title (an Irish one). In 1807 he was returned as member for Newport, Isle of Wight, and became junior lord of the admiralty in the Duke of Portland's administration. In 1809 he became secretary of war, and two years later he was elected

a member of Parliament for Cambridge University. He was a supporter of Catholic emancipation, and retired from office in the Wellington ministry in 1828 with others of the Canning party. He had already made a reputation for his command of foreign policy, and in 1830 he was made foreign secretary in the Whig ministry of Earl Grey. From this time he continued to be a member and leader of the Liberal party. In 1831 he was returned for Bletchingley, and after the Reform Bill (1832) for South Hants. He retired from office in December, 1834, but in April, 1835, he resumed his former

Erastus Dow Palmer

appointment under Lord Melbourne. He continued in office as foreign secretary until 1841. It was during this period that he gained his great reputation for vigilance and energy in the conduct of foreign affairs. In 1845 he supported the repeal of the corn-laws, and in 1846 he was foreign secretary in the Russell ministry. Several causes of dissatisfaction, the chief being his recognition of Louis Napoleon without consulting his colleagues, led to Palmerston's resignation in December, 1851. In February, 1852, he became home secretary in the coalition ministry of Lord Aberdeen. On the resignation of this ministry he became prime-minister, which position he held, with a brief interruption, for the remainder of his life. He was made D.C.L. of Oxford in 1862, and elected Lord-rector of Glasgow University in 1863.

Palmerton, a borough of Carbon Co., Pennsylvania, 10 miles S. E. of Mauch Chunk, incorporated 1912. It has coal and other interests. Pop. (1920) 7168.

Palmer Worm, the common name for all the hairy caterpillars, but particularly that of the tiger-moth (*Arctia caja*).

Palmetto Palm (pal-met'tō), a common name of several palms, especially of the *Sabal Palmetto*, the cabbage-palm, which grows in the West Indies and in the Southern States of North America. It attains the height of 40 or 50 feet, and is crowned with a tuft of large leaves. It produces useful timber, and the leaves are made into hats, mats, etc.

Palmipedes (păl-mĭp'ĕ-dēz). See *Natatores.*

Palmistry. See *Cheiromancy.*

Palmitic Acid (pal-mit'ik), a fatty acid occurring in many fats, whether of the animal or vegetable kingdom, such as palm-oil, butter, tallow, lard, etc., existing partly in a free state but generally in combination with glycerine (as a glyceride). It forms a solid, colorless, inodorous body, which melts at 62° C.

Palm-kale (pâm'kāl), a variety of the cabbage extensively cultivated in the Channel Islands. It grows to the height of 10 or 12 feet, and has much the aspect of a palm.

Palm-oil, a fatty substance obtained from several species of palms, but chiefly from the fruit of the oil-palm, or *Elæis guineensis*, a native of the west coast of Africa. This tree grows to the height of 30 feet, bears a tuft of large pinnate leaves, and has a thick stem covered with the stumps of the stalks of dead leaves. The fruits, which are borne in dense clusters, are about 1½ inches long by 1 inch in diameter, and the oil is obtained from under their fleshy covering. In cold countries it acquires the consistence of butter, and is of an orange-yellow color. It is employed in the manufacture of soap and candles, for lubricating machinery, wheels of railway-carriages, and many other purposes. By the natives of the Gold Coast this oil is used as butter; and when eaten fresh

Palm-oil Tree (*Elæis guineensis*).

is a wholesome and delicate article of diet. It is called also *Palm-butter.*

Palms (pämz), the Palmaceæ, a nat. order of arborescent endogens, chiefly inhabiting the tropics, distinguished by their fleshy, colorless, six-parted flowers, enclosed within spathes; their minute embryo, lying in the midst of albumen, and remote from the hilum; and their rigid, plaited or pinnated leaves, sometimes called fronds. The palms are among the most interesting plants in the vegetable kingdom, from their beauty, variety, and associations, as well as from their great value to mankind. While some, as *Kunthia montāna, Oreodoxa frigida*, have trunks as slender as the reed, or longer than the longest cable (*Calamus rudentum* being 500 feet), others, as *Jubæa spectabilis* and *Cocos butyracea*, have stems 3 and even 5 feet thick; while some are of low growth, as *Attalēa amygdulina*, others exhibit a stem towering from 160 to 190 feet high, as *Ceroxylon andicōla* or wax-palm of South America. Also, while they generally have a cylindrical, undivided stem, *Hyphæne thebaica* (the doum palm of Upper Egypt) and *Hyphæne coriacea* are remarkable for their repeatedly divided trunk. About 600 species are known, but it is probable that many are still undescribed. Wine, oil, wax, flour, sugar, sago, etc., are the produce of palms; to which may be added thread, utensils, weapons, and materials for building houses, boats, etc. There is scarcely a single species in which some useful property is not found. The cocoanut, the date, and others are valued for their fruit; the cabbage-palm, for its edible terminal buds; the fan-palm, with many more, is valued for its foliage, whose hardness and durability render it an excellent material for thatching; the sweet juice of the Palmyra and others, when fermented, yields wine; the center of the sago-palm abounds in nutritive starch; the trunk of the wax-palm exudes a valuable wax; oil is expressed in abundance from the oil-palm; many of the species contain so hard a kind of fibrous matter that it is used instead of needles, or so tough that it is manufactured into cordage; and, finally, their trunks are in some cases valued for their strength, and used as timber, or for their elasticity or flexibility. There is only one European species, the *Chamærops humilis*. See *Chamærops;* also, *Areca, Betel-nut, Cabbage-palm, Cocoanut, Coquilla-nut, Date, Doum Palm, Fan-palm, Palm-oil, Palmyra Palm*, etc.

Palm-sugar, a saccharine substance obtained from the juice of various palms.

Palm Sunday, the last Sunday before Easter, on which Christ's entry into Jerusalem, when palm branches were strewed before him, is celebrated. It is still celebrated with much solemnity by the Roman Catholics, and branches are strewed in the churches.

Palm Wine or Toddy, a species of wine obtained by fermenting the juice of the flowers and stems of the cocoanut palm, the Palmyra palm, the oil-palm, and other palms.

Palmyra (pal-mī'rȧ; Hebrew, *Tadmor*, City of Palms), an ancient city of Syria, now in ruins, situated in an oasis 140 miles E. N. E. of Damascus. It was founded or enlarged by Solomon in the tenth century B.C. It was an entrepôt for the trade between Damascus and the Mediterranean, and during the wars between the Romans and the Parthians it acquired great importance. It became the faithful ally of Rome, and during the reign of Gallienus (260–268) Odenathus, the ruler of Palmyra, established an independent Palmyrene kingdom. Odenathus was succeeded by his widow Zenobia, to whom Palmyra chiefly owes its fame, and who took the title of Queen of the East. She was besieged in Palmyra by Aurelian, and compelled to surrender. On his departure the inhabitants revolted, on which Aurelian returned and destroyed the city (A.D. 273). He permitted the inhabitants to rebuild it, but it never recovered its importance. In 1400 Tamerlane completely destroyed it. There are remains of ancient buildings, chiefly of the Corinthian order, with the exception of the Temple of the Sun, which is Ionic. See *Zenobia.*

Palmyra Palm (*Borassus flabelliformis*), the common Indian palm, a tree ranging from the northeastern parts of Arabia through India to the Bay of Bengal. In India and other parts of Asia it forms the chief support of 6,000,000 or 7,000,000 of population. Its fruit is a valuable food, its timber is excellent, and it furnishes thatch, cordage, and material for hats, fans, umbrellas, etc. It produces sugar and arrack, and its leaves are used for writing tablets. The young shoots are boiled and eaten, the seeds are edible, and the fruit yields a useful oil.

Palo Alto, a city of Santa Clara Co., California, 30 miles S. E. of San Francisco. Seat of Leland Stanford, Jr., University. Pop. 5000.

Palolo (pa-lō'lō), a dorsibranchiate annelid (*P. viridis*) found in great abundance in the sea near the coral

Palmyra Palm (*Boriassus flabelliformis*).

reefs in the South Sea Islands. They are taken in large numbers in nets by the islanders, who esteem them, when roasted, as a great delicacy.

Palos (pā'lōs), a small town of Andalusia, in Spain, famous as the port whence Columbus sailed for the discovery of the New World in 1492. Pop. 1200.

Palpi (pal'pi), jointed processes, supposed to be organs of touch, attached in pairs to the labium and maxilla of insects, and termed respectively *labial* and *maxillary palpi* or feelers. (See figure at *Entomology*.) Palpi are developed also from the oral appendages of spiders and crustacea.

Palpitation (pal-pi-tā'shun) consists of repeated attacks of violent and spasmodic action of the heart. When palpitation arises from organic lesion of the heart it is called *symptomatic*, when it is caused by other disorders disturbing the heart's action it is called *functional*. Disorders which may cause palpitation include nervous affections, anæmia, chlorosis, protracted mental emotion, excessive use of stimulants, etc.

Palsy (pąl'si), paralysis, especially a local or less serious form of it. See *Paralysis*.

Paludal Diseases (pal'ū-dal; L. *palus, palūdis*, a marsh), diseases arising, like malaria, in marshy places.

Paludan-Müller (pål'ō-dån mül'-lèr), FREDERIK, the chief recent poet of Denmark, born in 1809, and educated at Copenhagen University. He began his career as a poet in 1832, and died in 1871. His works include *Adam Homo*, a humorous didactic poem; *Kalanus*, an Indian tragedy; *Adonis*, a poetic romance; *Amor and Psyche*, a lyrical drama, etc.

Palunpur. See *Pahlanpur*.

Pamiers (pà-mi-ā), a cathedral city of S. France, dep. Ariège. It has ironworks and textile and other mills. Pop. 7728.

Pamir (pä'mēr), an elevated region of Central Asia, that may be regarded as formed by the meeting of the Himalayan and Thian Shan mountain systems. It forms a plateau having a general elevation of more than 13,000 feet, dominated by still loftier ridges and summits clothed with eternal snow. There are several small lakes here, and the sources of the Oxus take their rise in the Pamir. The atmosphere is exceedingly dry, the extremes of heat and cold are very great, and a large part of the surface is bare and barren. The Kirghiz, however, find a certain amount of pasture for their cattle in summer, and in favored localities there is a little cultivation. The Pamir, or 'roof of the world,' is celebrated throughout Central Asia, and trade routes have passed across it for ages.

Pamlico Sound (pam'li-kō), a shallow lagoon on the southeast coast of North Carolina. It is 80 miles long, from 8 to 30 miles wide, and separated from the ocean by long, narrow, sandy islands. Vessels can enter it through Ocracoke and Hatteras inlets.

Pampas (pam'pas), a name given to the vast treeless plains of South America in the Argentine Republic, Paraguay, and Uruguay. The pampas are generally covered with grass and other herbage, and in many parts with gigantic thistles, but with the heat of summer the vegetation is much burned up. Shallow lakes or swamps occur in some parts, and parts have the character of a salt steppe. The pampas are roamed over by various tribes of Indians, as well as by herds of wild horses and cattle. In many parts there are now cattle ranches, and large flocks of sheep are also reared.

Pampas-grass (*Gynerium argentēum*), a grass which grows in the pampas in the southern parts of South America. It has been introduced in the United States and Europe

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THROUGH THE PANAMA CANAL

The U. S. battleship "Ohio" in the east chamber of the Pedro Miguel Locks. On the left is seen one of the four electric locomotives used in taking a vessel through a lock.

as an ornamental plant. It has panicles of silvery flowers on stalks more than 10 feet high, and its leaves are from 6

Pampas-grass (*Gynerium argenteum*).

to 8 feet long. The male and female flowers are on separate stalks.

Pampero (pam-pā'rō), a violent wind from the west or southwest which sweeps over the pampas of South America.

Pamphylia (pam-fil'i-a), an ancient province of Asia Minor, extending along the Mediterranean from Cilicia on the east to Lycia on the west. It was mountainous, being covered with the ramifications of the Taurus Mountains. Pamphylia never attained any political importance. It was subject successively to Persia, Macedonia, Syria, and Rome, although some Greek colonies for a time succeeded in maintaining their independence.

Pamplona (pam-plō'na), or PAMPELU'NA, a city of Spain, and capital of the province of Navarre or Pamplona, and of the ancient kingdom of Navarre, on the Arga, 78 miles northwest of Saragossa, 197 northeast of Madrid. The town is strongly fortified, and has a cathedral dating from the end of the fourteenth century. The public fountains are supplied by a magnificent aqueduct. Pop. 28,886.

Pan, a rural divinity of ancient Greece, the god of flocks and herds, represented as old, with two horns, pointed ears, a goat's beard, goat's tail, and goat's feet. The worship of Pan was well established, particularly in Arcadia. His festivals were called by the Greeks *Lycæa*, and were known at Rome as the *Lupercalia*. Pan invented the syrinx or *Pandean* pipes.

Pan.

Pana, a city of Christian county, Illinois, 42 miles S. E. of Springfield. It has coal-mining interests, a hay compress, creamery, etc. Pop. 6122.

Panama (pan-a-mä'), the capital of the Republic of Panama, at the head of the Bay of Panama, at the south shore of the Isthmus, and on the Panama Canal. The harbor is shallow and most of the city's trade is carried on through the Canal Zone port of Balboa. It is the Pacific terminus of the Panama Railroad. The original town of Panama was founded 1518. The present city dates from 1673. Population 61,369.

Panama, a republic of Central America, formerly a department of the Republic of Colombia, occupying the Isthmus connecting North and South America. Its extreme length is about 480 miles; breadth, between 37 and 110 miles; total area, 32,380 square miles. The principal exports are bananas, cocoanuts, hides, and gum. A railroad 47 miles long, owned by the United States, connects the ports of Colon and Panama. There are other railroads in the republic.

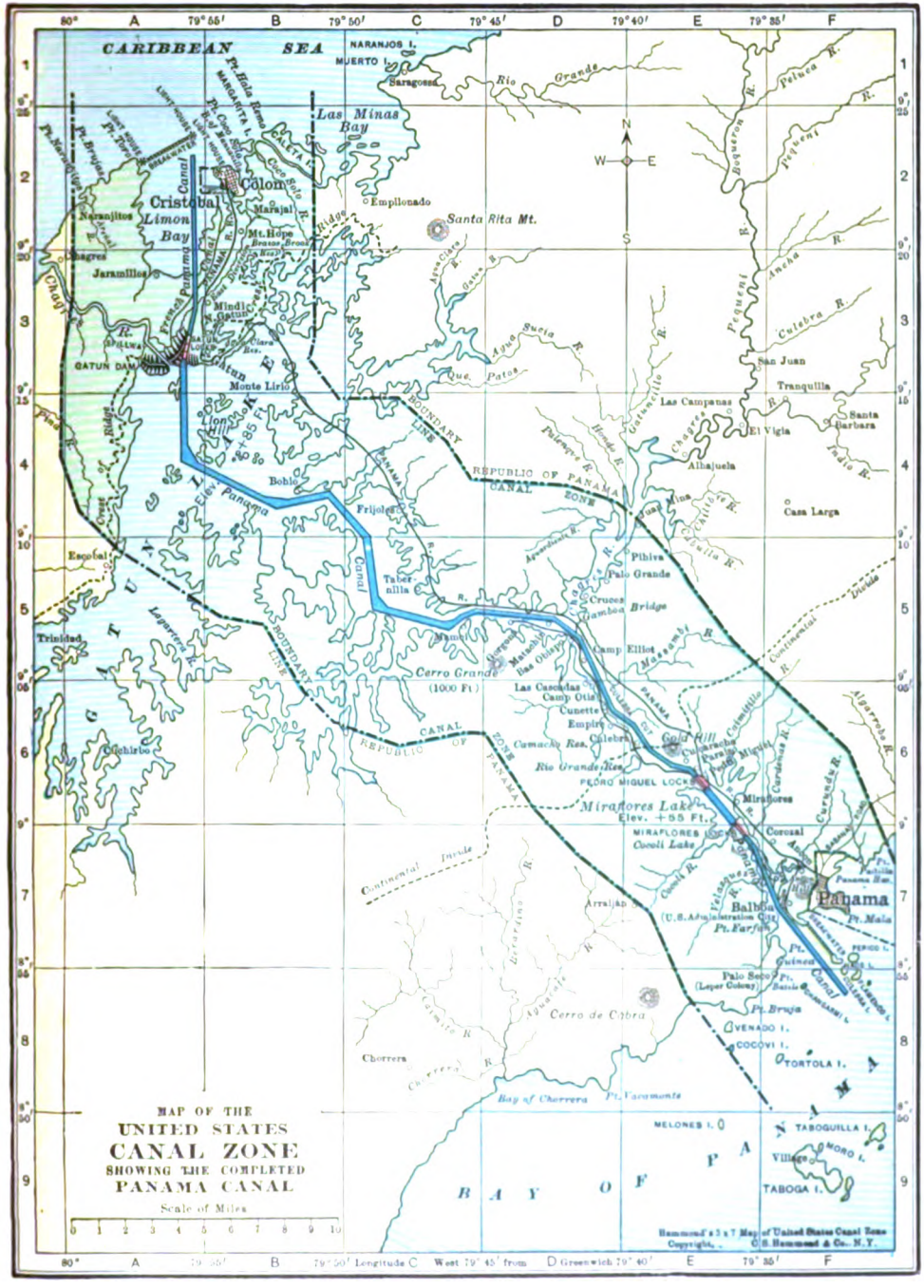
Panama asserted its independence November 3, 1903. Colombia felt aggrieved on the ground that the United States had assisted Panama in establishing its independence, and the sum of $25,000,000 was awarded Colombia by the United States, by treaty ratified by the Senate, April, 1921. The constitution of 1914, amended 1918, provides for a Chamber of Deputies of 33 members, which meets biennially, and for a President of the Republic, elected by direct vote for four years. Pop. (1912), excluding Canal Zone, 336,742; (1917) 450,000.

Panama, ISTHMUS OF, formerly called the Isthmus of Darien, has a breadth of from 40 to 120 miles, con-

nects North with South America, and separates the Pacific from the Atlantic. The coast is rocky and lofty along the Caribbean Sea, but low and swampy along the Pacific. See *Panama*.

Panama Canal, a ship canal long discussed and finally cut across the Isthmus of Panama from the Atlantic to the Pacific Ocean. This immense enterprise was originally undertaken in 1881 by a French company under M. de Lesseps, the maker of the Suez Canal. The work of excavation went on until 1887, when the enormous expenditure of money ($226,000,000) and the comparatively little work accomplished brought operations to an end, the company falling into difficulties, and suspending payment in 1889. In 1892 criminal proceedings were instituted by the French government against the leading officers of the canal company, and they and several prominent French officials were convicted of bribery. The abandoned work was taken up by another company, but no marked progress was made. Meanwhile a project had developed within the United States to excavate a similar canal across Nicaragua, surveys had been made and other preliminary steps taken. At this juncture the French company offered to sell its partly completed canal and its right obtained under treaty with Colombia to the United States for $40,000,000. In consequence of this offer the Nicaragua Canal project was abandoned. The Senate of Colombia refusing to ratify this purchase, the department of Panama seceded (November, 1903), formed an independent republic, and made the requisite concessions of right of way and dominion, for which $10,000,000 was to be paid. The preliminary negotiations completed, the United States Canal Commission was reorganized, with eminent expert engineers as its members, and in 1905 the work was actually resumed. Excavation, however, was preceded by sanitation. The region to be excavated was subject to yellow fever, malaria, and other tropical diseases, through the effects of which the French working force had been terribly decimated. In the interval that had elapsed successful methods of handling and preventing those diseases had been developed, and within a year or two after the date above given the canal zone had been cleansed of the scourge of yellow fever, and made as healthful as probably any part of the United States, the comfort as well as the health of the workmen had been attended to, and in the years of active excavation that followed the death- and sick-rate proved to be marvellously reduced. When the work of excavation was once fairly begun, it progressed at a rapidity that surprised the world, the use of enormous dredging machines and working appliances not in existence at the date of the French operations enabling the American engineers to prosecute their work with unprecedented speed. The total amount of earth removed by the two French companies had been about 78,000,000 cubic yards. Much of this was useless in the new plan and about 232,000,000 cubic yards in all had to be removed. The formal opening of the canal took place January, 1915; but on August 16, 1914, the canal was officially opened, the steamship Ancon, 10,000 tons register, owned by the United States War Department, being the first vessel to make the trip. Twelve hours is the time set for the average passage, and any ship up to 10,000 tons register may be admitted.

The length of the canal from the Atlantic to the Pacific shore line is 40½ miles, and is about 50 miles between deep water at its two extremes. It has a minimum depth of 41 feet and a minimum width of 300 feet, the average bottom width being 649 feet. The great difficulty in this enterprise was the crossing of the mountain range, and the creation of a wonderful artificial canyon. The excavation of this ridge (the Culebra cut, as it is called) was the greatest problem to be solved in making the canal, and numerous slides greatly retarded progress. A second was the disposition of the Chagres River, the valley of which, and at intervals the channel, is followed by the canal. It is subject to sudden and great floods in the time of tropical rains, and from the start was a serious difficulty to the engineers. The ridge and the river rendered the original idea of a sea-level canal at once extremely costly and highly perilous, and a lock canal, with a summit level 85 feet above sea-level, was chosen instead. This rendered necessary locks (three on the Atlantic and two on the Pacific side), those on the Atlantic being located together at Gatun, about 7 miles from deep water on the canal route. Here an enormous concrete dam was constructed, 8000 feet, or 1½ miles in length along its crest, and 2100 feet broad at its greatest width. The crest of the dam is at an elevation of 115 feet, or 30 feet above the level of the great Gatun Lake, which the dam has made by holding back the waters of the Chagres. This lake is about 1000 feet wide for a distance of 16 miles, when it narrows to 800 feet for 3.8 miles, 500 feet for 3.7 miles and finally to 300 feet, being in the Culebra cut. The cost of building the canal, including fortifications, is placed at $400,-



MAP OF THE
UNITED STATES
CANAL ZONE
SHOWING THE COMPLETED
PANAMA CANAL

Hammond's 3 x 7 Map of United States Canal Zone
Copyright, . . C. S. Hammond & Co., N. Y.

80° A 79° 55′ B 79° 50′ Longitude C West 79° 45′ from D Greenwich 79° 40′ E 79° 35′ F

000,000; and the yearly cost of operating is estimated at $3,500,000.

Panama-Pacific Exposition, an international exposition celebrating the completion of the Panama Canal, opening February 20, 1915. The exposition was financed and controlled by San Francisco and California, but it received federal recognition and invitations to the various nations to participate were issued by President Taft. The European War did not prevent European participation in the affair, and Canada, Mexico, and the republics of Central and South America were well represented. The exposition grounds, fronting on San Francisco Bay, were beautifully laid out, and the novel color scheme, calling for the entire absence of white, produced highly artistic results. A second exposition held in San Diego was called the Panama-California Exposition.

Pan-American Exposition, an exhibition participated in by the countries of North and South America, held at Buffalo, New York, in 1901, intended to represent the progress of Americans during the nineteenth century. Over 8,000,000 people attended the exposition, and it was here that President McKinley was assassinated.

Pan-American Union, the official organization supported by the American republics and devoted to the encouragement of Pan-American commerce and friendship. The *Pan-American Conference* is a congress of representatives of these republics, the first meeting of which was held at Washington, D. C., 1889–90. A second meeting was held at Mexico in 1901, a third at Rio de Janeiro in 1906, and a fourth at Buenos Ayres in 1910. These meetings have been productive of much good in developing friendly relations between the American republics.

Panay (pä-nī'), an island of the Philippines, between Mindoro and Negros. It is of triangular form with an area of 4750 square miles. It is mountainous but very fertile, and the inhabitants have made considerable progress in civilization. Capital Iloilo. Pop. 743,646.

Pancoast (pan'kōst), JOSEPH, an eminent surgeon, born in Burlington Co., New Jersey, in 1805; died in 1882. For many years he held professorships of surgery and anatomy in the Jefferson Medical College of Philadelphia (1847–74), and his discoveries materially aided the progress of surgery. He was also surgeon in the Pennsylvania Hospital (1854–64). He gained a high reputation for skill in surgery.

Pancreas (pan'krē-as), the sweetbread of animals; one of the viscera of the abdomen. In men it lies behind the stomach in front of the first and second lumbar vertebræ. The pancreas is an oblong gland about 8 inches long, 1½ inches broad, and from ½ to 1 inch thick. Its right extremity, called the *head*, lies in a bend of the duodenum. The *tail* or left extremity extends to the spleen. The structure of the pancreas is similar to that of the salivary glands. It is composed of lobules throughout. The secretion of this gland is conveyed to the intestine by the *pancreatic duct*. This duct runs from right to left, and is of the size of a quill at its intestinal end. The *pancreatic juice* is a clear, ropy fluid. The functions of the pancreatic juice in digestion are devoted to the conversion of starchy elements into sugar and to the assimilation of fatty matters. It also acts upon albuminoid matters.

Pancsova (pân'cho-vâ), a town of Hungary, 8 miles E. N. E. of Belgrade, at the confluence of the Temes with the Danube. It is well built, and carries on a good trade with Turkey. Pop. (1910) 20,808.

Panda (pan'da), or WAH (*Ailurus fulgens*), an animal of the bear family, found in the woody parts of the mountains of Northern India,

Panda (*Ailurus fulgens*).

about equal to a large cat in size. It is chestnut-brown in color, and dwells chiefly in trees, preying on birds, small quadrupeds, and large insects.

Pandanaceæ (pan-da-nā'se-ē), the Screw-pine family of plants, endogenous trees or shrubs, with flowers unisexual or polygamous; perianth wanting, or consisting only of a few scales. The fruit is either in parcels of fibrous drupes or in berries. The leaves are long, imbricated, and amplexicaul. Aerial roots are a feature of many. The order is divided into two sections, *Pan-*

daneæ and *Cyclantheæ;* the first with undivided leaves and no perianth, the second with fan-shaped or pinnate leaves, and flowers having a few scales. They are tropical plants, and furnish edible and other useful products. Panama hats are made from one species. The typical genus is *Pandănus.* See *Screw-pine.*

Pandects (pan'dektz), a collection of laws, systematically arranged, from the works of Roman writers on jurisprudence, to which the Emperor Justinian gave the force of law, A.D. 533. See *Corpus Juris.*

Panderpur (pan'dur-pör), PANDHARPUR, a town in Bombay, India, held in great reverence by the Brahmans for its Temple of Vishnu. Pop. 32,405.

Pandi'on. See *Osprey.*

Pandit (pan'dit), or PUNDIT, a learned Brahman; one versed in the Sanskrit language, and in the sciences, laws and religion of the Hindus.

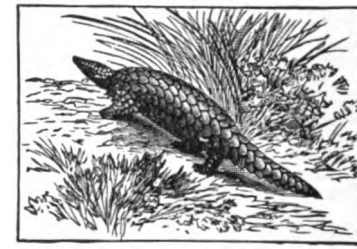
Pandoors (pan'dörz), the name given to a body of Hungarian soldiers, who, about the middle of last century, were dreaded for their savage mode of warfare.

Pandora (pan-dō'ra), in Greek mythology, the first woman on earth, sent by Zeus to mankind in vengeance for Prometheus's theft of heavenly fire. Each of the gods gave her some gift fatal to man. According to later accounts, the gods gave her a box full of blessings for mankind, but on her opening the box they all flew away, except hope. Epimetheus, brother of Prometheus, married her.

Panel (pan'el), a schedule or roll of jurors. (See *Jury.*) In Scottish law, the prisoner at the bar is the panel.

Pangenesis (pan-jen'i-sis), a theory of reproduction offered by Charles Darwin, in his *Animals and Plants under Domestication.* He suggests that all units of the body throw off minute granules, which gather from all parts of the body to form the sexual elements, their development in the next generation forming a new being. It will suffice to say that this theory has not been accepted.

Pangolin (pan'gō-lin), the name applies to the Scaly Anteaters (Manidæ), forming a family of the Edentate order of mammals. They occur in Southern Asia and Africa; have the body invested by a covering of imbricated scales of horny material: vary from 3 to 4 feet in length, and defend themselves by assuming the form of a ball. The tail is long, and the feet are provided with strong curved claws, which assist the animals in burrowing. The jaws



Four-toed Pangolin (*Manis tetradactyla*).

are destitute of teeth, and the tongue is of great length. The food consists of insects. The four-toed pangolin (*Manis tetradactyla*) inhabits W. Africa.

Panic (pan'ik), the name of some species of millet (*Panicum*).

Panicle (pan'i-kl), a form of inflorescence differing from a raceme in having a branched instead of a simple axis. See *Inflorescence.*

Pânini (pa-nē'nē), a celebrated Indian grammarian who is supposed to have lived not later than the 4th century B.C. His Sanskrit grammar is highly scientific, but extremely abstruse.

Panipat (pä-nē-pat'), a town of India, in the Punjab, 50 miles north by west of Delhi; surrounded by an old wall. Pop. about 30,000.

Panizzi (pä-nit'zē), SIR ANTHONY, principal librarian of the British Museum, born at Brescello, Modena, in 1791. Having engaged in revolutionary movements, he came to England in 1822, and became professor of Italian in University College in 1828. In 1837 he was appointed keeper of printed books in the British Museum, and succeeded to the principal librarianship in 1856. He conceived and designed the plan for the new library and reading room, which is at once novel and very convenient. He died in 1879.

Panjim. See *Goa.*

Panjnad. See *Punjnud.*

Panna. See *Punnah.*

Panniar. See *Punniar.*

Pannonia (pan-nō'ni-a), the ancient name of a district of Europe comprising the eastern parts of Austria, Carinthia, Carniola, the part of

Hungary between the Danube and the Save, Slavonia, and parts of Croatia and Bosnia. The Pannonians were finally subdued by Tiberius, A.D. 8, and Pannonia became a Roman province. It had numerous towns, of which Vindobona (Vienna) was the chief.

Panompenh. See *Pnom-penh.*

Panorama (pan-o-rä'ma; from Gr. *pan*, all, the whole, and *horāma*, view), a painting in which all the objects that can be seen naturally from one point are represented on the concave side of a whole or half cylindrical wall, the point of view being the axis of the cylinder. A painting of this kind when well mounted produces a complete illusion, and no other method is so well calculated to give an exact idea of an actual view. See *Diorama.*

Panslavism (pan'slav-izm), a general name for the efforts or aspirations of the Slavonic races in Europe, or some of them, after union, including the Russians, Czechs, Servians, Bulgarians, etc.

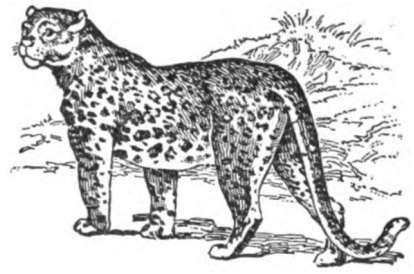
Pan'tagraph. See *Pantograph.*

Pantellaria (pän-tel-lä-rē'a), a fertile volcanic island of the Mediterranean, 50 miles E. S. E. of Cape Bon in Africa, and 80 miles southwest of Sicily, of which it is a dependency; length, north to south, 9 miles; breadth, 6 miles. It produces figs, raisins, wine, olives, etc. Pop. 8619.

Pantheism (pan-thē'izm; Gr. *pan*, all, and *theos*, god), in philosophy, the doctrine of the substantial identity of God and the universe, a doctrine that stands midway between atheism and dogmatic theism. The origin of the idea of a God with the theist and the pantheist is the same. It is by reasoning upon ourselves and the surrounding objects of which we are cognizant that we come to infer the existence of some superior being upon whom they all depend, from whom they proceed, or in whom they subsist. Pantheism assumes the identity of cause and effect. Matter, not less than mind, is with it the necessary emanation of the Deity. The unity of the universe is a unity which embraces all existing variety, a unity in which all contradictions and all existing and inexplicable congruities are combined. Pantheism has been the foundation of nearly all the chief forms of religion which have existed in the world. It was represented in the East by the Sankhya of Kapila, a celebrated system of Indian philosophy. The Persian, Greek and Egyptian religious systems were also pantheistic. Spinoza is the most representative pantheist of modern times. A twofold division of pantheism has been proposed:— 1. That which loses the world in God, one only Being in whose modifications are the individual phenomena. 2. That which loses God in the world and totally denies the substantiality of God.

Pantheon (pan'thē-on, or pan-thē'-on; Greek, *pan*, all; *theos*, god), a celebrated temple at Rome, built in 27 B.C. by Marcus Agrippa. It is a large edifice of brick, built in circular form, with a portico of lofty columns. It has the finest dome in the world (142½ feet internal diameter, 143 feet internal height), and its portico is almost equally celebrated. It is now a church, and is known as Santa Maria Rotonda. Raphael and other famous men are buried within its walls. The Pantheon in Paris, for some time the church of St. Geneviève, is a noble edifice with a lofty dome, devoted to the interment of illustrious men. The piazza of the Pantheon, cleared by Eugenius IV of the ruins, which included basalt lions and bronze figures, was called the Valley of the She-Goat.

Panther (pan'thẽr; *Felis pardălis*), one of the Felidæ or Cat tribe, of a yellow color, diversified with



Panther (*Felis pardălis*)

tribe, of a yellow color, diversified with roundish, black spots, a native of Asia and Africa. The panther is now supposed to be identical with, or a mere variety of, the leopard. (See *Leopard.*) The name panther (in vulgar language *painter*) is given to the puma in America.

Pantograph (pan'tō-graf), also called PANTAGRAPH and PENTAGRAPH (from Gr. *pan*, all, and *graphein*, to write or delineate), an instrument consisting of four limbs joined together by movable joints, and so constructed that by means of it maps and plans may be copied mechanically either

on the scale on which they are drawn or on an enlarged or reduced scale. It is made in a variety of forms.

Pantomime (pan'tu-mim), properly a theatrical representation without words, consisting of gestures, generally accompanied by music and dancing. The modern Christmas pantomime is a spectacular play of a burlesque character, founded on some popular fable, and interspersed with singing and dancing, followed by a harlequinade, the chief characters in which are the harlequin, pantaloon, columbine and clown, which may be traced back to the Italian pantomime, although their present development is almost entirely modern.

Paoli (pā'o-lē), PASQUALE DE, a Corsican patriot, born in 1725; died in 1807. In 1755 he was appointed captain-general by his countrymen, who were struggling for their independence against Genoa. He organized the government and military resources of the island, and maintained a protracted and generally successful struggle with the Genoese. The latter being unable to subdue the island, sold it to France in 1768. After a brief struggle Paoli was obliged to yield, and took refuge in England. After the Revolution of 1789 he was recalled by the National Assembly, and made governor of Corsica. Disagreements with the Democratic party in France followed, and despairing of maintaining, unaided, the independence of the island, he promoted its union with England. Subsequently he withdrew to England, and received a pension from the British government.

Papa (pä'pa), a town of Hungary, 75 miles west of Budapest. It has a castle of the Esterhazy family, a Protestant college, etc. Pop. 17,426.

Papa (pā'pā), the Low Latin form of Pope, the name given by the Greek churches to all their priests.

Papacy. See *Popes.*

Papal Flag, the authorized flag of the Roman Catholic Church with two stripes, gold and white, running perpendicularly.

Papal States (pā'pal), the name given to that portion of Central Italy of which the pope was sovereign by virtue of his position. The territory extended irregularly from the Adriatic to the Mediterranean, and eventually comprised an area of 15,289 square miles with 3,126,000 inhabitants. Rome was the capital. The foundation of the Papal States was laid in 754, when Pepin le Bref presented the exarchate of Ravenna to Stephen II, Bishop of Rome. Benevento was added in 1053, and in 1102 Matilda of Tuscany left Parma, Modena, and Tuscany to the pope. In 1201 the Papal States were formally constituted an independent monarchy. Subsequently various territories were added to or subtracted from the pope's possessions, which were incorporated with France by Napoleon in 1809, but restored to the pope in 1814. A revolution broke out in Rome in 1848, and the pope fled to Gaeta, but he was reinstated by French troops, and Rome was garrisoned by French soldiers until 1870. In the meantime one state after another threw off its allegiance to the pope and joined the kingdom of Italy, and when the French left Rome in August, 1870, King Victor Emmanuel took possession of the city, declared it the capital of Italy, and thus abolished the temporal power of the pope.

Papantla (pä-pänt'lä), a town of Mexico, in the state of Vera Cruz, about 120 miles northeast of Mexico. It indicates its ancient splendor by its massive ruins. Pop. about 10,000.

Papa'ver. See *Poppy.*

Papaveraceæ (pa-pa-vėr-ā'se-ē), the poppy family of plants, an order belonging to the polypetalous division of the exogens. It contains about 160 species, mostly members of the northern temperate regions. They are smooth herbs, rarely shrubs, with alternate, often cut leaves, and solitary, handsome flowers. The poppies are the most familiar members.

Papaw (pä-pä'; *Carica Papāya*, nat. order Papayaceæ), a tree of South America, now widely cultivated in tropical countries. It grows to the height of 18 to 20 feet, with a soft herbaceous stem, naked nearly to the top, where the leaves issue on every side on long footstalks. Between the leaves grow the flower and the fruit, which is of the size of a melon. The juice of the tree is acrid and milky, but the fruit when boiled is eaten with meat, like other vegetables. The juice of

Papaw (*Carica Papaya*).

Courtesy of the West Virginia Pulp & Paper Co.

MAKING PAPER

This view shows the machine room in a paper mill, with two machines in operation.

the unripe fruit is a powerful vermifuge; the powder of the seed even answers the same purpose. The juice of the tree or its fruit, or an infusion of it, has the singular property of rendering the toughest meat tender, and this is even said to be effected by hanging the meat among the branches.—The papaw of North America is *Asimina triloba*, nat. order Anonaceæ; it produces a sweet, edible fruit.

Paper (pā'pėr), a thin and flexible substance, manufactured principally of vegetable fiber, used for writing and printing on, and for various other purposes. Egypt, China, and Japan are the countries in which the earliest manufacture of paper is known to have been carried on. The Egyptian paper was made from the papyrus (whence the word *paper*), but this was different from paper properly so called. (See *Papyrus.*) According to the Chinese the fabrication of paper from cotton and other vegetable fibers was invented by them in the second century B.C. From the East it passed to the West, and it was introduced into Europe by the Arabs. Spain is said to have been the first country in Europe in which paper from cotton was made, probably in the eleventh century; and at a later period the manufacture was carried on in Italy, France, and Germany. It cannot now be ascertained at what time linen rags were first brought into use for making paper; but remnants of Spanish paper of the twelfth century appear to indicate that attempts were made as early as that time to add linen rags to the cotton ones. The earliest paper manufactory known to have been set up in England was that of John Tate, at Stevenage, in Hertfordshire, about 1495. The manufacture in England, however, long remained in a backward state, so that until late in the eighteenth century the finer qualities of paper were imported from France and Holland.

After the introduction into Europe of cotton and linen rags as materials for papermaking, other vegetable fibers were for many centuries almost entirely given up, rags being cheaper than any other material. It was only about the close of the eighteenth century that paper-manufacturers again began to turn their attention to the possibility of using vegetable fibers as substitutes for rags, one of the earliest signs of the new departure being a work containing sixty specimens of paper made from different vegetable materials, published in 1772 by a German named Schöffer or Schäffers. Straw, wood and esparto are the chief vegetable fibers which have been found most suitable for the purpose.

The process by which paper is produced depends on the minute subdivision of the fibers, and their subsequent cohesion; and before the making of the paper properly begins the rags or other materials have to be cleaned from impurities, boiled in a strong lye, and reduced by special machinery to the condition of a thin pulp, being bleached with chloride of lime. It is at this stage of the manufacture that size is added, and toned and other colored papers have the coloring matter introduced. The pulp, composed of the fibrous particles mixed with water, is now ready to be made into paper.

Paper is made either by the hand or by machinery. When it is made by the hand the pulp is placed in a stone vat, in which revolves an agitator, which keeps the fibrous particles equally diffused throughout the mass; and the workman is provided with a *mold*, which is a square frame with a fine wire bottom, resembling a sieve, of the size of the intended sheet. These molds are sometimes made with the wires lying all one way, except a few which are placed at intervals crosswise to bind the others together, and sometimes with the wires crossing each other as in a woven fabric. Paper made with molds of the former kind is said to be *laid*, and that made with those of the latter kind *wove*. The so-called *watermark* on paper is made by a design woven in wire in the mold. Above the mold the workman places a light frame called a *deckle*, which limits the size of the sheet. He then dips the mold and deckle into the pulp, a portion of which he lifts up horizontally between the two, gently shaking the mold from side to side, to distribute the fibers equally and make them cohere more firmly, the water, of course, draining out through the wire meshes. The sheets thus formed are subjected to pressure, first between felts, and afterwards alone. They are then *sized*, pressed once more, and hung up separately on lines in a room to dry. The freedom with which they are allowed to contract under this method of drying gives to handmade paper its superior firmness and compactness. After drying they are ready for making up into quires and reams, unless they are to be glazed, which is done by submitting the sheets to a very high pressure between plates of zinc or copper.

In papermaking by machinery, a process patented in France in the end of the eighteenth century, the pulp is placed in iron vessels at one end of the ma-

chine, and is kept constantly agitated by a revolving spindle with arms attached to it. From these the pulp passes to the *pulp-regulator*, by which the supply of pulp to the machine is kept constant, thence through sand-catchers and strainers till it reaches the part of the machine which corresponds to the hand-mold. This consists of an endless web of brass wire-cloth, which constantly moves forward above a series of revolving rollers, while a vibratory motion from side to side is also given to it, which has the same object as shaking the mold in making by the hand. Meanwhile its edges are kept even by what are called *deckle* or *boundary straps* of vulcanized India rubber. At the end of the wire-cloth the pulp comes to the *dandy-roll*, which impresses it with any mark that is desired. The fabric is now received by the felts, also, like the wire part of the machine, an endless web, the remaining water being pressed out in this part of the machine by four or five consecutive rollers. If intended for a printing-paper, or any other kind that requires no special sizing, it is dried by being passed round a succession of large hot cylinders, with intermediate smoothing rolls. It is then rendered glossy on the surface by passing between polished cast-iron rollers called *calenders*, and is finally wound on a reel at the end of the machine, or submitted to the action of the cutting machinery, by which it is cut up into sheets of the desired size. If the paper is to be sized, the web, after leaving the machine, is passed through the sizing-tub, and is then led round a series of large skeleton drums (sometimes as many as forty) with revolving fans in the inside, by the action of which it is dried. If the paper were dried by hot cylinders after the sizing, there would be a loss of strength in consequence of the drying being too rapid. After being dried the paper is glazed by the *glazing-rollers*, and then cut up. In some cases the sizing is done after the paper has been cut into sheets, these being then hung up to dry on lines, like hand-made paper, acquiring in the process something of the same hardness and strength. The total length of a paper-machine, from the beginning of the wire-cloth to the cutters, is frequently more than 100 feet.

Paper was made from straw at the beginning of the last century, and the material is now largely used. The chief and best use of straw is to impart stiffness to common qualities. To prevent brittleness, however, it is necessary to destroy the silica contained in the straw by means of a strong alkali. Paper is now also made entirely from wood, previously reduced to a pulp; much the greater part of it being thus made. Esparto or Spanish grass, exported largely from Spain, Algeria, Tripoli, Tunis, and other countries, has been applied to papermaking only in comparatively recent years, but has risen rapidly into favor. The use of rushes for papermaking belongs to America, and dates from the year 1866. The root of the lucern has also been applied with success in France of late years to the fabrication of paper. Various mineral substances are sometimes added to the fibrous materials necessary to make paper, such as a silicate of alumina called Lenzinite, kaolin or porcelain earth, and artificial sulphate of barium (permanent white). The first two substances have a tendency to diminish the tenacity of the fabric; the last is thought by some manufacturers to be beneficial to printing-papers, enabling them to take a clearer impression from the ink.

Blotting and filtering paper are both made in the same way as ordinary paper except that the sizing is omitted. Copying paper is made by smearing writing paper with a composition of lard and black-lead, which, after being let alone for a day or so, is scraped smooth and wiped with a soft cloth. Incombustible paper has been made from asbestos, but since fire removes the ink from a book printed on this material, the invention is of no utility, even though the paper itself be indestructible. Indelible check paper has been patented on several occasions. In one kind of it the paper is treated with an insoluble ferrocyanide and an insoluble salt of manganese, and is sized with acetate of alumina instead of alum. Parchment paper or vegetable parchment is made from ordinary unsized paper by treatment with sulphuric acid or oil of vitriol and ammonia. The so-called rice paper is not an artificial paper, but a vegetable membrane imported from China, and obtained apparently from the pith of a plant called *Aralia papyrifera*. Tissue paper is a very thin paper of a silky softness used to protect engravings in books and for various other purposes. Tracing paper is made from tissue paper by soaking it with Canada balsam and oil of turpentine or nut-oil and turpentine.

In recent times the uses of paper have greatly multiplied. Besides being largely employed for making collars, cuffs, and other articles of dress, it is sometimes used for making huts in the backwoods of America; for making boats, pipes, and tanks for water; cuirasses to resist mus-

ket-bullets, wheels for railway-carriages, and even bells and cannons. Paper wheels have been used for some of Pullman's railway saloon cars in America, and have worn out one set of tires. Cannons made of paper have actually been tried with success. These are only a few of the articles made of paper. We may add to them barrels, vases, milk-bottles, straw hats, into which no straw enters; clothing, handkerchiefs, etc. Even whole houses have been built of paper — in Norway is a church, holding 1000 persons, built entirely of it. The demand for paper has become so great, in view of the vast quantities now used for printing purposes, that more than 3,000,000 cords of wood are now used annually in this country for making paper pulp, and large quantities in Canada, spruce yielding the principal supply. Other species are being experimented with and even the stalks of the cotton plant.

In England a tax or duty on paper was imposed in the reign of Queen Anne, and was not repealed till 1861. At one time the duty was levied according to size or value, but later by weight. So long as it was payable according to size, paper, as it proceeded from the mill, was cut with rigorous exactness into certain standard sizes, distinguished by different names. These were frequently departed from when the duty was made payable according to weight, but a number of sizes distinguished by different names are still made, such as *pot*, *foolscap*, *post*, *royal*, *imperial*, etc. These are now the names of standard sizes of paper, royal being 19x24 inches.

Paper-hangings, ornamental papers often pasted on the walls of the rooms in dwelling-houses. The staining of papers for this purpose is said to be a Chinese invention, and was introduced into France early in the seventeenth century. It is now common everywhere. but more especially in France, England, and the United States. Most of the processes in paper-staining are now usually done by machinery; but there is still much hand-work in the finer qualities, especially those produced in France. The first operation is that of grounding, which consists in covering the surface with some dull color, the tint of which varies. Papers with a glazed ground are usually glazed immediately after receiving the ground tint. The designs on the surface of paper-hangings are applied by hand processes and machines exactly similar to those employed in calico-printing. (See *Calico-printing.*) *Flock-paper* is made by printing on the parts which are to receive the flock a mixture of strong oil boiled with litharge and white lead, to render it drying. The colored flock is then sprinkled on the paper, and adheres to the parts to which the mixture has been applied.

Paper Money. See *Currency.*

Paper Mulberry. See *Mulberry.*

Paper Nautilus. See *Argonaut.*

Paphlagonia (paf-la-gō'ni-a), the former name of a mountainous district in the north of Asia Minor, between Bithynia on the west and Pontus on the east, separated from the latter by the Halys. On the coast was the Greek city Sinope. Paphlagonia was first subdued by Crœsus, king of Lydia, and afterwards formed part of the Persian Empire, until its satraps made themselves independent. It was ruled by native princes from 316 B.C. until subdued by Mithridates (63 B.C.), on whose overthrow the district was incorporated with the Roman Empire.

Paphos (pā'fos), the name of two ancient cities in Cyprus — Old Paphos, a little more than a mile distant from the southwestern coast, upon a height; and New Paphos (modern *Baffa*), 7 or 8 miles to the northwest of Old Paphos, situated on the seashore. The first was famous in antiquity for the worship of Aphroditē (Venus). At New Paphos St. Paul preached before the proconsul Sergius.

Papias (pā'pi-as), a Christian writer of the age succeeding that of the apostles. He is described by Irenæus as a 'hearer of John and a companion of Polycarp,' and was martyred at Pergamus in 163 A.D. He was the author of five books on the *Sayings of our Lord*, all lost, except a few valuable fragments, which give important information as to the early traditions regarding the New Testament: *e.g.* that Matthew's Gospel was believed to have been written in Hebrew, and that the Evangelist Mark was the interpreter (*hermeneutēs*) of Peter, and wrote to his dictation.

Papier Mâché (pāp-yā mä-shā; Fr. 'mashed paper'), a substance made of cuttings of white or brown paper boiled in water, and beaten in a mortar till they are reduced into a kind of paste, and then boiled with a solution of gum Arabic or of size to give tenacity to the paste. Sulphate of iron, quicklime, and glue or white of egg, are sometimes added to enable the material to resist the action of water, and borax and phosphate of soda to render

it to a great extent fire-proof. It is used for making all sorts of useful and ornamental articles that can be formed in molds. Another variety of papier mâché is made by pasting or gluing sheets of paper together, and pressing them when soft into the form which it is desired to give them.

Papilio (pa-pil'i-ō), a genus of butterflies (Lepidoptera), containing some well-known species, as the swallow-tailed butterfly (*Papilio machāon*), the peacock butterfly (*P. Io*), etc.

Papilionaceæ (pa-pil-yo-nā'she-ē), a division of plants, forming a suborder of the Leguminosæ (which see), distinguished by the resemblance of the superior petals of their flowers to the extended wings of a butterfly (Latin, *papilio*). The best-known examples are the pea and bean, which are the typical plants of this division.

Papillæ (pa-pil'ē), the name applied in physiology to small or minute processes protruding from the surface of the skin, or of membranes generally, and which may possess either a secretory or other function. The human skin exhibits numerous papillæ, with divided or single extremities, and through which the sense of touch is chiefly exercised. The papillæ of the tongue are important in connection with the sense of taste. See *Skin* and *Tongue*.

Papin (pâ-paṇ), Denys, natural philosopher, born in Blois, in France, in 1647. Having visited England, he was in 1681 admitted a fellow of the Royal Society. The revocation of the Edict of Nantes preventing him from returning to his native country, he settled at Marburg, in Germany, in 1687, as professor of mathematics, retaining this charge till 1707. He is believed to have died in Germany about 1714. He is best known for the invention denominated Papin's Digester (see *Digester*).

Papinianus (pap-in-i-ā'nus), Æmilius (Papinian), a Roman lawyer, born under Antoninus Pius, about 140 A.D. His learning and integrity won him the first offices of state, and he was ultimately chosen prefect of the prætorian guards under the Emperor Septimius Severus, whom he accompanied to Britain. The Emperor Caracalla caused him to be executed in 212. In the Pandects are 595 excerpts taken from his works.

Papion (pā'pi-on), *Cynocephălus sphinx*, a species of dog-headed baboon, akin to the mandril. It was held in great reverence in Egypt, selected individuals being kept near the temples, in the caves of which their mummied forms have been often found.

Pappenheim (pap'en-hīm), Gottfried Heinrich, Count of, imperial general in the Thirty Years' war, born in 1594 at Pappenheim, in Bavaria. He distinguished himself in the battle of Prague as colonel, in 1620; in 1623-25 served in Lombardy as commander of a regiment of cuirassiers (the Pappenheim dragoons). In 1626 he conquered, with the assistance of the Bavarians, 40,000 peasants in Upper Austria, and in 1630 joined Tilly, who ascribed the loss of the battle of Leipzig in 1631 to his impetuosity. He appeared on the field of Lützen on the side of Wallenstein, but was mortally wounded, and died the day after the battle, 1632.

Pappus (pap'us), in botany, the feathery appendage that crowns many single-seeded seed-vessels; for example, the down of the dandelion.

Pappus, Alexandrinus, mathematician, flourished at Alexandria in the fourth century after Christ. All his works appear to have perished, except portions of his *Mathematical Collections*, which possess great value, and have sufficed to found his fame. They include geometrical problems and theorems, a treatise on mechanics, etc.

Papu'a. See *New Guinea*.

Papyrus (pa-pī'rus; *Papўrus antiquōrum*, or *Cypĕrus papyrus*), an aquatic plant belonging to the nat. order Cyperaceæ or sedges. It has acquired celebrity from furnishing the paper of the ancient Egyptians. The root is very large, hard, and creeping; the stem is several inches thick, naked, except at the base, 8 to 15 or more feet high, triangular above, and terminated by a compound, wide-spreading, and beautiful umbel, which is surrounded with an involucre composed of eight large sword-shaped leaves. The little scaly spikelets of inconspicuous flowers are placed at the extremity of the rays of this umbel. Formerly it was extensively cultivated in Lower Egypt, but is now rare there. It is abundant in the equatorial regions of Africa in many places, and is found also in Western Africa and in

Egyptian Papyrus (*Papўrus antiquorum*).

Southern Italy. The inhabitants of some countries where it grows manufacture it into various articles, including sail-cloth, cordage, and even wearing apparel and boats. Among the ancient Egyptians its uses were equally numerous, but it is best known as furnishing a kind of paper. This consisted of thin strips carefully separated from the stem longitudinally, laid side by side, and then covered transversely by shorter strips, the whole being caused to adhere together by the use of water and probably some gummy matter. A sheet of this kind formed really a sort of mat. In extensive writings a number of these sheets were united into one long roll, the writing materials being a reed pen and ink made of animal charcoal and oil. Thousands of these papyri or papyrus rolls still exist (many of them were found in the ruins of Herculaneum), but their contents, so far as deciphered, have only been of moderate value.

Par (pär; Latin, 'equal') is used to denote a state of equality or equal value. Bills of exchange, stocks, etc., are *at par* when they sell for their nominal value; *above par* or *below par* when they sell for more or less.

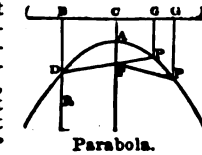
Para (pâ-râ'), a small Turkish and Egyptian coin, of copper or copper and silver, the fortieth part of a Turkish piaster (grush). Value, about ⅛ of a cent.

Pará (pâ-râ'), or BELEM, a city and seaport in Brazil, capital of the province of Pará, on the right bank of the estuary of the Pará (or of the River Tocantins). The principal buildings are the governor's palace, the cathedral, and the churches of Santa Anna and São João Baptista. It is the seat of the legislative assembly of the province. The port, defended by forts, is capable of admitting vessels of large size. The principal exports are caoutchouc, cacao, Brazil nuts, copaiba, rice, piassava, sarsaparilla, annatto, cotton, etc. Pop. (1913) 170,000.

The province of Pará, the most northerly in Brazil, comprises an area of 443,790 square miles on both sides of the lower Amazon, and consists chiefly of vast alluvial plains connected with this river and its tributaries. These latter comprise the Tapajos and the Xingu, besides many others, the Tocantins being another great stream from the south. The province possesses immense forests, and is extremely fertile, but there is little cultivation, the inhabitants being fewer than one to the square mile. The trade centers in the capital. It is now facilitated by steamboats navigating the Amazon and Tocantins. Pop. estimated at 852,000.

Parable (par'a-bl), a short tale in which the actions or events of common life are made to serve as a vehicle for moral lessons. The parable is a mode of teaching peculiarly adapted to the Eastern mind, and was common among the Jews before the appearance of Christ. It is exemplified in the Old Testament in the parable addressed by Nathan to David (II Sam., xii), and there are frequent examples of it in the Talmud and the Gospels.

Parabola (par-ab'u-la), one of the curves known as conic sections. If a right cone is cut by a plane parallel to a slant side, the section is a parabola. It may also be defined as the curve traced out by a point which moves in such a way that its distance from a fixed point, called the 'focus,' is always equal to its perpendicular distance from a fixed straight line, called the 'directrix.' In the figure B H is the directrix and F the focus, while P is a point that moves so that the perpendicular G P is always equal to the line P F; the curve P A D described by a point so moving is a parabola. The line F A C through the focus is the axis or principal diameter; any line parallel to it, as B D E, is a diameter. The path of a projectile in vacuo, when not a vertical straight line, is parabolic.



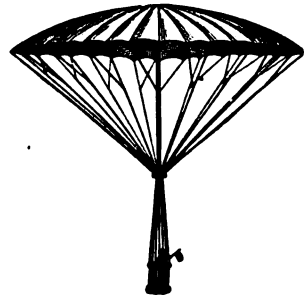
Parabola.

Parabolani (par-a-bo-lâ'ni), in the early Christian church, a class of men whose chief duty was to attend on the sick and diseased.

Paracelsus (par-a-sel'sus), or PHILIPPUS AUREOLUS THEOPHRASTUS BOMBASTUS VON HOHENHEIM, empiric and alchemist, born at Einsiedeln, in the canton of Schwyz, in Switzerland, in 1493. Dissatisfied with the means of acquiring knowledge in his native country, he traveled over the greater part of Europe, everywhere seeking to add to his knowledge. In the course of his travels he became acquainted with remedies not in common use among physicians (probably preparations of mercury), by means of which he performed extraordinary cures, and obtained great reputation. In 1526 he accepted the chair of medicine offered him by the magistrates of Basel, and lectured there till the spring of 1528. The failure of a lawsuit, and the consequent quarrel with the judges, led him to resume his wandering life, at first accompanied by his pupil Oporinus, who, however, disgusted with his violence and intemper-

ance, at length left him. He died at the hospital of St. Sebastian at Salzburg in 1541. For a long time he was regarded as little better than a charlatan, but he enriched science, particularly chemistry and medicine, with some valuable discoveries, and, indeed, is sometimes looked upon as the founder of modern therapeutics.

Parachute (pa'ra-shöt), an apparatus of an umbrella shape and construction, usually about 20 or 30 feet in diameter, attached to balloons, by means of which the aeronaut may descend slowly from a great height. It is shut when carried up, and expands by inflation when the aeronaut begins to descend; but it is not altogether to be depended on, and accidents in connection with its use have been frequent. The earliest



Parachute (Garnerin's Parachute descending).

mention of a machine of this kind is in a MS. describing experiments made with one in 1617. In 1783 the French physician Lenormand made several further experiments at Montpellier; and shortly after the machine became well known through the descents of Blanchard in Paris and London. See *Aeronautics.*

Paraclete (par'a-klēt; Gr. *paraklētos,* a counselor, comforter), the Comforter, the Holy Ghost (John, xiv, 16).

Paracoto, the bark of a South American tree, probably a species of Cryptocarya. The bark has a spicy odor and an aromatic and pungent taste. It is used as an appetizer and in diarrhœal diseases. Its active principle is called paracotoin, a pale yellow, crystalline body, tasteless and odorless and sparingly soluble in water.

Paradise (par'a-dīs), the garden of Eden. The word is originally Persian, and signifies a park. It was introduced into the Greek language in the form *paradeisos* by Xenophon, and has been introduced into modern languages as a name for the garden of Eden (and hence of any abode of happiness) through its use in that sense in the Septuagint.

Paradise, Bird of. See *Bird of Paradise.*

Paradox (par'a-doks), a statement or proposition which seems to be absurd, or at variance with common sense, or to contradict some previously-ascertained truth, though, when duly investigated, it may prove to be well founded.

Paradoxure (par-a-doks'ūr; *Paradoxūrus typus*), an animal of the civet family (Viverridæ), common in India, and known also as the palm-cat from its habit of climbing palm-trees to eat their fruit. It can curl its tail into a tight spiral. The general tint of the fur is a yellowish black, but it assumes various hues, according to the light in which it is viewed. On each side of the spine run three rows of elongated spots; other spots are scattered upon the shoulders.

Paraffin (par'a-fin), a solid white substance of a waxy appearance which is separated from petroleum and ozokerite, and is also largely obtained by the destructive distillation of various organic bodies, such as brown coal or lignite, bituminous coal, shale, etc. The process generally consists in heating bituminous shale in iron retorts at a low red heat; condensing the tarry products, and purifying these by distillation, washing successively with soda, water, and acid, and again distilling. Those portions of the oil which solidify in the final distillations are collected separately from the liquid portions, washed with soda and acid, and crystallized or again distilled. The partially purified paraffin (called *paraffin scale*) is now again treated with acid, allowed to solidify, submitted to the action of centrifugal machines, and finally strongly pressed in order to remove any liquid oil which may still adhere to it. The refined paraffin is largely manufactured into candles, which may be either white or colored, and may be mixed with a certain quantity of wax, etc. The liquid oils obtained in the process come into commerce under the general name of paraffin-oil, the lighter oils being used for illuminating and the heavier for lubricating purposes. Paraffin has received its name (Lat. *parum,* little; *affinis,* akin) on account of its remarkable indifference to or want of affinity with other substances. Besides being used for candles, it is used for vestas and tapers, for waterproofing,

sizing, and glazing fabrics, as an electric insulator, as a coating for the inside of beer barrels, etc.

Paragould (par'a-göld), a city, county seat of Green county, Arkansas, 67 miles N. by W. of Memphis. It has large stave factories, pottery works, etc. Pop. (1920) 6306.

Paraguay (pä'rä-gwī, or gwä), an inland republic of South America, surrounded by Argentina, Brazil, and Bolivia; area, 145,000 square miles. The whole surface belongs to the basins of the Paraguay and Paraná, numerous tributaries of which intersect the country. Along the Paraguay and in the south, adjoining the Paraná, are extensive swampy tracts; westward of the Paraguay the country is little known. Elsewhere the surface is well diversified with hill and valley, and rich alluvial plain. The climate is agreeable, the mean annual temperature being about 75°. The natural fertility of the soil is shown by a vegetation of almost unequaled luxuriance and grandeur. In the forests are found at least sixty varieties of timber-tree, besides dyewoods, gums, drugs, perfumes, vegetable oils, and fruits. Many of the hills are covered with the *yerba maté* or Paraguay tea. (See *Maté.*) The larger plains are roamed over by immense herds of cattle, which yield large quantities of hides, tallow, bones, etc.; and on all the cultivated alluvial tracts sugar-cane, cotton, tobacco, rice, maize, etc., are raised in profusion. The exports are mainly Paraguay tea, fruits, tobacco, sugar, hides, rubber, and other native products. Asuncion, the capital, Paraguari, and Villa Rica are connected by a railway about 90 miles long. Large river steamers ascend the Paraná and the Paraguay far above Asuncion.

Paraguay was originally a Spanish colony, the first settlement being made in 1535. In 1608 a number of Spanish Jesuits established a powerful and well-organized government, which lasted till 1758, when it was overthrown by the Brazilians and Spaniards. Early in the nineteenth century its isolated position enabled it by a single effort to emancipate itself from Spanish rule. Dr. Francia, secretary to the revolutionary junta in 1811, was elected consul, but exchanged the name for that of dictator in 1814, and thenceforward, by a rigorous system of espionage and the strict prohibition of all intercourse with other nations, retained his position till his death in 1840 at the age of eighty-four. In 1844 Don Carlos Antonio Lopez was elected president for ten years, and soon after the country was declared free and open both to foreigners and foreign commerce. Don Carlos Lopez remained president of Paraguay till his death in 1862, when he was succeeded by his son Don Francisco, who concluded treaties of commerce with England, France, the United States, Brazil, etc., and did all in his power to promote the growth of agriculture and industry in the land. But a disastrous war with Brazil and the Argentine Republic, which broke out in 1864 and only closed with the death of Lopez in 1870, caused the death of far the greater portion of the male adults and entirely checked the progress of Paraguay. A popular constitutional government has since been established, and the state is now making rapid progress in population and prosperity. The electoral law of November, 1916, provides for 20 Senators and 40 Deputies; the President is elected for a term of four years. The people are largely half-breeds or of Indian blood. In 1917 the total population was estimated at 1,000,000, not including the Chaco Indians, about 50,000.

Paraguay, a river of S. America, which rises in the Brazilian province of Matto Grosso, takes a course generally southwards, and joins the Paraná at the southwest angle of the state of Paraguay after a course of some 1300 miles. It receives the Pilcomayo, Vermejo, and other large rivers, and is a valuable highway of trade to Paraguay and Brazil.

Paraguay Tea. See *Maté.*

Parahyba (pä-rä-ē'bä), a maritime province of Brazil, between Rio-Grande-do-Norte on the north and Pernambuco on the south; area, 28,846 square miles. Much of the soil is of a sandy texture, though there are also extensive fertile tracts and large forests. Periodical droughts occur. Pop. about 600,000. The capital, PARAHYBA, is a cathedral city situated on the river of the same name, about 11 miles from its mouth. The harbor is much frequented by coasting vessels. Pop. (1908) estimate 30,000.

Parakeet (par'a-kēt), or PARROQUET, a subfamily or group of the Parrots, characterized by their generally small size and their long tail-feathers. The islands of the Eastern Archipelago form the chief habitat of these birds, but species also occur in India and Australia. Amongst the most familiar forms are the rose-ringed and Alexandrine parakeets. The former (*Palæornis torquātus*), found in India and on the eastern coasts of Africa, has a bright-green body and a

pink circle round the neck. The Alexandrine parakeet (*P. Alexandri*) of India is a nearly allied species. These birds may be taught to speak with distinctness. The ground parakeets of Australia live amongst the reeds and grass of swamps, generally in solitary pairs. The common ground parakeet of Australia (*Pezoporus formōsus*) possesses a green and black plumage, the tail being similarly colored, and the body-feathers

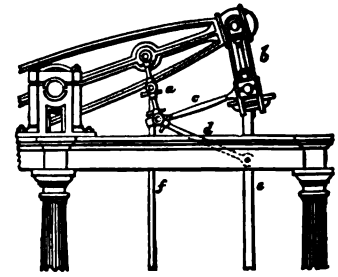
Rose-ringed Parakeet (*Palæornis torquātus*).

having each a band of dark-brown hue. The grass parakeets of Australia, of which the small warbling parakeet (*Melopsittăcus undulātus*) is a good example, inhabit the central flat lands of Australia, and feed on the seeds of the grasses covering the plains. They perch on the eucalypti or gum-trees during the day, and the nests are situated in the hollows of these trees. Contrary to most parrots, they have an agreeable voice.

Parallax (par'a-laks), the apparent change of place which bodies undergo by being viewed from different points. Thus an observer at A sees an object B in line with an object C, but when he moves to D it is in line with E, and seems to have gone backwards. The term has become technical in astronomy, and implies the difference of the apparent positions of any celestial object when viewed from the surface of the earth and from the center of either the earth or the sun. The term 'parallax' is also employed to denote the non-coincidence of the crossfibers in a telescope with the focus of the eyeglass.

Parallel Lines (par'el-el), in geometry, straight lines in the same plane which never meet, no matter how far produced.

Parallel Motion, a mechanical contrivance employed by Watt to communicate the alternate pushes and pulls of the piston-rod of a steam engine to the end of a vibrating beam, and which prevents the action of forces tending to destroy the right-line motion of the piston-rod. The motion given to the end of the rod is not accurately in a straight line, but it is



Part of Beam of Condensing Engine. *a b c d*, Parallel motion. *e*, Piston-rod. *f*, Pump-rod.

very nearly so. Watt's parallel motion is still employed in all stationary beam-engines. In marine beam-engines the arrangement employed differs somewhat in form, but is the same in principle as Watt's contrivance.

Parallelogram of Forces, an important dynamical principle, deduced by Newton, which may be stated thus: If two forces acting in different directions on a particle at the same time be represented in magnitude and direction by two straight lines meeting at the particle, their resultant effect in giving motion to the particle is that of a force represented in magnitude and direction by the diagonal (terminating in the particle) of the parallelogram, of which the two former lines are two sides.

Parallels, in military operations, are trenches formed by besiegers to cover their assault, being so named because they generally run parallel with the outlines of the fortress assailed. The communication from one to the other is effected by means of ditches formed in zigzag, so that they may not be raked by the fire of the fortress. Vauban first made use of them in 1673, at the siege of Maestricht.

Parallels of Latitude. See *Latitude.*

Paralysis (pa-ral'i-sis), a bodily ailment, which in its effect consists in loss of power in moving or loss of feeling, or in both, and it is caused by injury or disease of the brain, spinal cord, or nerves, or it may be due to lead or other poison affecting some part of the nervous system. When the paralysis is limited to one side of the body, and the voluntary power of moving the muscles is lost, this is due to disease or injury of the brain which is of a one-sided or localized character, and receives the specific name of *hemiplegia*. It is generally caused by the bursting of a blood-vessel in the brain; it may also be due to a blood-vessel being blocked by a clot of blood. The paralysis may be sudden and without unconsciousness, or it may be gradual and attended with sickness, faintness, and confusion of mind. In ordinary cases it will be found that one side of the body is powerless, the face twisted, the speech thick and indistinct. Recovery may be complete or partial, or the attack may prove fatal. In any case the shock is apt to be repeated. When one side of the body and the opposite side of the face are affected, the disease receives the name of *crossed paralysis*, and is considered more dangerous than ordinary hemiplegia. When, again, the disease is situated in the spinal cord, the paralysis, which receives the name of *paraplegia*, may affect either the upper or lower part of the body, or motion may be lost on one side and sensation on the other. Sometimes a double hemiplegia or *diplegia* exists. Paralysis is said to be *spastic* or *flaccid;* in the former case the affected parts are rigid, in the latter they are flaccid and show marked wasting. *Partial* or *local paralysis* or *paresis* is an old term used when disease or injury affects a specific nerve-trunk, and has no connection with disease of the brain or spinal cord. See *Paresis*.

Paramaribo (par-a-mar'i-bō), the capital of Dutch Guiana or Surinam, about 18 miles above the mouth of the River Surinam, which is navigable for vessels of considerable size. It is the center of the Dutch West Indian trade, and exports sugar, coffee, etc. The harbor is protected by Forts Zeelandia and New Amsterdam. Pop. 35,000.

Paramatta (par-a-mat'a), or PARRAMATTA, a town in New South Wales, on a river of same name (really an extension of Port Jackson), in a beautiful and well-cultivated district, 14 miles west of Sydney. Woolen cloth is manufactured to some extent; and in the vicinity there are large salt-works and copper-smelting furnaces. Much fruit is grown in the district. The town is oldest in the colony except Sydney. Pop. 12,568.

Paramatta, a light, twilled fabric with a weft of combed merino wool and cotton warp. It was invented at Bradford, in Yorkshire, where it is still largely manufactured.

Paraná (pä-rä-nä'), a river in South America, the largest except the Amazon, and draining a larger basin than any other river in the New World except the Amazon and the Mississippi. It is formed by the junction of two streams, the Rio Grande and the Paranahyba, which meet in Brazil, and it discharges itself into the estuary of the La Plata, its final course being through the Argentine Republic. Its principal tributaries are the Paraguay and the Salado, both from the right. All the tributaries on its left are comparatively short. Its length, from its sources to its junction with the Paraguay, is probably 1500 miles and thence to the sea 600 miles more. In breadth, current, and volume of water, the Paraná has ten times the magnitude of the Paraguay, which is itself superior to the greatest European rivers. It is an important waterway to the interior of the country, though with obstructions at certain points.

Paraná, a province of Southern Brazil, having on the north the province of São Paulo, east the Atlantic, south the province of Santa Catharina, and west Paraguay and the province of Matto Grosso; area, 85,429 square miles. Its chief town is Curitiba. Pop. (1913) 486,404.

Paranahyba (pâ-rä-nâ-ē'bâ), one of the head streams of the River Paraná (which see).

Parapet (par'a-pet), in fortification, a work, usually of earth, intended to protect the troops within the ramparts, as well as the pieces of artillery used in the defense. In order to fire, the defenders ascend a ledge called a banquette, about half-way up the parapet. In architecture the term parapet is applied to the structures placed at the edges of platforms, balconies, roofs of houses, sides of bridges, etc., to prevent people from falling over.

Paraphernalia (par-a-fêr-nā'li-a), in law, a woman's apparel, jewels, and other things, which, in the lifetime of her husband, she wore as the ornaments of her person, and to which she has a distinct claim.

Paraple'gia. See *Paralysis*.

Parasang (par'a-sang), a Persian measure of distance used both in ancient and modern times. Its

modern Persian name is *ferseng*, and its length is estimated at from 3½ to 4 English miles.

Paraselene (pa-ra-se-lē'nē), a luminous ring or circle sometimes seen round the moon, or there may be more than one ring as well as certain bright spots, bearing some resemblance to the moon. Paraselene or mock moons are analogous to parhelia or mock suns.

Parasite (par'a-sīt), the name applied to animals which attach themselves to the exterior, or inhabit various situations in the interior, of the bodies of other animals, including such forms as tapeworms, flukes, scoleces or hydatids, fish-lice, bird-lice, common lice, etc. True parasites obtain their nourishment from the animals on which they live, but there is another class of parasites that only obtain a lodging or abode at the expense of the animals they accompany. See *Commensal.*

Parasitic Diseases (par-a-sit'ik), such as are produced by parasitic animals or plants. Among the animals producing such diseases are the guinea-worm, the louse, the trichina, tapeworm, etc. The vegetable parasites which produce disease in animals are either fungi or algæ. Ringworm is an example of this class.

Parasitic Plants, such plants as grow on others, from which they receive their nourishment. In this class are many fungi, such as the *Urēdo caries*, which produces the formidable disease called bunt, to which wheat is liable. Among larger parasites are the mistletoe; and the genus *Rafflesia*, belonging to Sumatra and Java. Parasites are distinguished from *epiphytes*, inasmuch as the latter, though they grow upon other plants, are not nourished by them. See *Epiphyte.*

Paray le Monial (pâ-rā le mō-nyal'), a town of France, dep. Saône-et-Loire, a common place of pilgrimage, as the place where the holy nun Marie Alacoque died in 1690. Pop. (1906) 3382.

Parbuckle (par'buk'l), a method of raising or lowering any cylindrical body, such as a barrel, by an inclined plane and a rope, the rope being doubled, the double placed round a post at the top of the plane, and the ends passed under and round the object to be raised or lowered, when by pulling or slackening this can be accomplished.

Parcel Post (pär'sel pōst), an extension of the postal service of the United States by the admission to the mails of parcels of merchandise of greater weight than four pounds, and for lowering the rate on this class of matter. On April 1, 1911, a measure providing for a limited Parcel Post on rural free delivery routes went into effect; and this measure was followed by further legislation in 1912. On January 1, 1913, a new law went into effect, providing for general Parcel Post service throughout the United States, and the regulations have since been modified. The new system means simply the extension of the present fourth class of mail matter to permit the mailing of parcels weighing as much as twenty pounds (or fifty for the first and second zones), and the substitution of a sliding scale of rates, according to distances, for the flat rate of one cent an ounce or fraction thereof. Books, not at first included, were later added to the Parcel Post classification (March 16, 1914), in packages weighing more than 8 ounces. Parcel Post matter is mailable only at post offices, branch offices, lettered and localized stations, and such numbered stations as may be designated by the postmaster, or it may be delivered to a rural or other carrier duly authorized to receive such matter. Packages must not exceed seventy-two inches in girth and must be prepared for mailing in such manner that the contents may be easily examined.

Parchim (pär'hēm), a town of Germany, in the Grand-duchy of Mecklenburg-Schwerin, on the Elbe, 21 miles southeast of Schwerin. It has manufactures of woolen cloth; flour, oil, paper and saw mills, etc. Pop. 10,397.

Parchment (parch'ment), the skins of sheep, she-goats, and several other animals, so dressed or prepared as to be rendered fit for writing on. This is done by stretching the skin on a frame, separating all the flesh and hair from the skin, reducing its thickness with a sharp instrument, and smoothing the surface with pumice-stone covered with pulverized chalk or slaked lime. After it is reduced to something less than half its original thickness, it is smoothed and slowly dried for use.

Pardoe (par'dō), JULIA, novelist and historian, born at Beverly, England, in 1806; died in 1862. She wrote numerous novels, descriptions of life in Constantinople and Hungary, and works dealing with French history.

Pardon (par'dun), the remission of the penalty of a crime or offense. In England, in nearly all cases of crimes except where there is an impeachment, a pardon from the crown may be granted before a trial as well as after; and it stops further progress in the inquiry and prosecution at whatever time it is granted. In cases of impeachment no pardon can now be granted by the

crown while the prosecution is pending; but after conviction of the offender it may be granted as in other cases. In the United States the pardoning power is lodged in the President, and the Governors of most of the States, and extends to all offenses except those which are punished by impeachment after conviction. In some States concurrence of one of the legislative bodies or of a Pardoning Board is required.

Pardubitz (pär'du-bitz), a town of Bohemia, on the Elbe. It has an interesting old castle, has various industries, and is a place where large horse-fairs are held. Pop. 17,029.

Paré (pȧ-rā), AMBROISE, the father of French surgery, born early in the sixteenth century at Laval; studied at Paris. He acted for a time as an army-surgeon, and in 1552 he became surgeon to Henry II, under whose successors (Francis II, Charles IX, and Henry III) he held the same post. From this it was said that 'Paré was a legacy of the crown.' He died in 1590.

Paregoric Elixir (par-a-gor'ik), known also as the camphorated tincture of opium, is a solution of powdered opium, camphor, benzoic acid, and oil of anise. When used carefully it is found to be an excellent anodyne and antispasmodic, but produces deleterious effects that must be guarded against.

Pareira (pa-ri'ra), a Portuguese name given to the roots of certain plants employed in medical practice, as valuable tonics and diuretics. The sort admitted into the pharmacopœia is called *Pareira brava*, and is produced by *Cissampelos Pareira*, nat. order Menispermaceæ.

Pareja (pȧ-rā'hȧ), JUAN DE, a Spanish painter, 'the slave of Velasquez,' born of West Indian parents at Seville in 1606; died in 1670. In early life he was employed in menial work in the studio of Velasquez, and by closely watching his methods attained considerable skill secretly. At the intercession of Philip IV he obtained his freedom, but continued in the family of Velasquez till his death. His success was chiefly in portraits, but he also painted several large pictures closely imitative of the style of his master.

Parent and Child, besides being a natural relationship, has its legal aspects, in which legitimacy and illegitimacy form a clear distinction. Various laws govern the relation in different countries, and in the United States it is generally held that the right of protection and support due from a parent to a child is dependent on general principles of the common law, as well as of morality, statutory provisions existing in most of the states. The reciprocal rights of parent and child cease when the child has attained his majority; but may be revived on either side: thus if an adult child become a pauper the parent becomes responsible for its support, and if the parent become a public burden the adult child is responsible. The parent can leave his property away from his children. The right to the custody of the child belongs to both parents; the child's preference being consulted if he is 14 years old or over, and if not the court may use its discretion. The father may collect his child's earnings, and sue for damages for loss of services from injuries inflicted by a third party. An action may be brought by the child when the parent is killed through another's negligence. The mother and putative father of an illegitimate child are liable for its support.

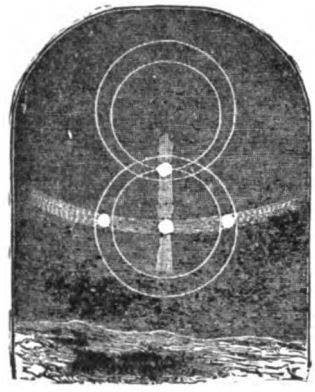
Pargetting (par'jet-ing), PARGE-WORK, a term used for plaster-work of various kinds, but commonly applied to a particular sort of ornamental plaster, with patterns and ornaments raised or indented upon it, much used in the interior and often in the exterior of houses of the Tudor period. Numbers of wooden houses so ornamented on the outside, and belonging to the time of Queen Elizabeth, are still to be met with.

Parepa-Rosa, MADAME EUPHROSYNE, a distinguished vocalist and actress, born at Edinburgh in 1835; died in 1874. She made her first appearance as *Amina* when sixteen years old. Her voice had extraordinary compass and power, and she sang with brilliant success. She married Carl Rosa, her manager, in 1867.

Paresis (par'e-sis), a term sometimes used to denote a partial paralysis (see *Paralysis*); and sometimes used to denote general paralysis of the insane, which is a disease of the brain with marked mental disturbances. This latter condition is usually considered to be of parasyphilitic origin.

Parhelion (par-hē'li-on), a mock sun, having the appearance of the sun itself, and occasionally seen by the side of that luminary. Parhelia are sometimes double, sometimes triple, and sometimes more numerous. They appear at the same height above the horizon as the true sun, and they are always connected with one another by a white circle or halo. They are the result of certain modifications which light undergoes when it falls on the crystals of ice, rain-drops,

or minute particles that constitute suitably situated clouds. Parhelia which appear on the same side of the circle with



Parhelia.

the true sun are often tinted with prismatic colors.

Paria (pä'ri-a), GULF OF, an inlet of the Atlantic on the northeast coast of South America, between the island of Trinidad and mainland of Venezuela, enclosed on the north by the Peninsula of Paria. It possesses good anchorage, and receives some arms of the Orinoco.

Pariah (pä'ri-a), a name somewhat loosely applied to any of the lowest class of people in Hindustan, who have, properly speaking, no caste; hence, one despised and contemned by society; an outcast. Properly, however, Pariah (a Tamil name) is applied to the members of a somewhat widely spread race in Southern India, generally of the Hindu religion, and though regarded by the Hindus as of the lowest grade, yet superior to some ten other castes in their own country. They are frequently serfs to the agricultural class, or servants to Europeans.

Parian Chronicle. See *Arundelian Marbles.*

Parian Marble (pä'ri-an), a mellow-tinted marble, highly valued by the ancients, and chosen for their choicest works. The principal blocks were obtained from Mount Marpassus, in the island of Paros.

Parima (pa-rē'ma), or PARIME, SIERRA, a mountain range situated in the N. E. of Venezuela. In general it is composed of bare plateaus, and its highest peaks rise to a height of about 8000 ft. The Essequibo, Orinoco, and Rio Branco have their rise in this range.

Parini (pa-rē'nē), GIUSEPPE, an Italian poet, born in 1729; died in 1799. He studied at Milan, published some youthful poetry, and wrote a dramatic satire on the Milanese aristocracy entitled *Il Giorno* ('The Day'). He was latterly professor of rhetoric at Milan.

Pari passu, in law, a term signifying equally in proportion, without preference: used especially of the creditors of an insolvent estate who (with certain exceptions) are entitled to payment of their debts in shares proportioned to their respective claims.

Paris (par'is), a genus of plants of the nat. order Trilliaceæ. *P. quadrifolia* (herb-paris, true-love, or one-berry) is not uncommon in Britain, being found in moist, shady woods. It has a simple stem bearing a whorl of four ovate leaves near the summit, and a solitary greenish flower. The fruit is a purplish-black berry.

Paris (pa'ris, Fr. pron. pȧ-rē'; anciently, *Lutetia Parisiorum*), the capital of France and of the department of the Seine. The city lies in the Seine valley surrounded by heights, those on the north being Charonne La Villette, the Buttes-Chaumont and Montmartre; those on the south St. Geneviève, Montrouge and the Butte-aux-Cailles. Through the valleys between these heights the river runs from east to west, enclosing two islands, upon which part of the city is built. It is navigable by small steamers. The quays or embankments, which extend along the Seine on both sides, being built of solid masonry, protect the city in some measure from inundation and form excellent promenades. The river, which within the city is fully 530 ft. in width, and has a length of 7 miles, is crossed by numerous bridges, the more important being Pont Neuf, Pont des Arts, Pont du Carrousel, Pont Royal, Pont de l'Alma, etc. The city is surrounded by a line of fortifications which measures 22 miles; outside of this is the enceinte, while beyond that again are the detached forts. These now form two main lines of defense. The inner line consists of sixteen forts, the outer line of 18 forts besides redoubts; the area thus enclosed measuring 430 square miles, with an encircling line of 77 miles. The climate of Paris is temperate and agreeable. The city is divided into twenty arrondissements, at the head of each of which is a *maire.* Each arrondissement is divided into four quarters, each of which sends a member to the municipal

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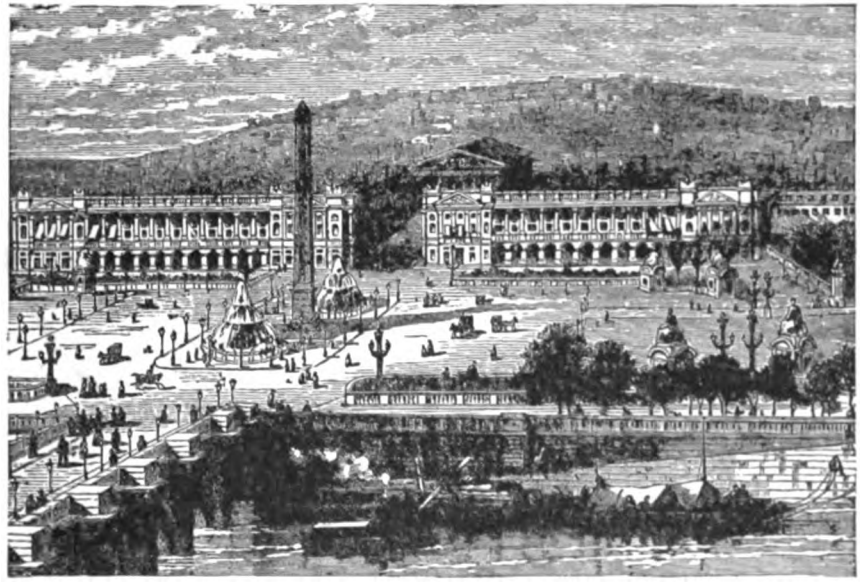
THE EIFFEL TOWER, PARIS

This gigantic structure, 984 feet high, was built for amusement purposes. The tower is also used as a transatlantic wireless station, and by scientists in observing air currents and weather

council. The council discusses and votes the budget of the city. At the head are the prefect of the Seine and the prefect of police. The water supply of the city is derived from the Seine and the Marne, from the Ourcq Canal, from artesian wells, and from springs.

Streets, Boulevards, etc.— The houses of Paris are almost all built of white calcareous stone, and their general height is from five to six stories, arranged in separate tenements. Many of the modern street buildings have mansard roofs, and are highly enriched in the Renaissance manner. In the older parts of the city the streets are narrow and irregular, but in the newer districts the avenues are straight, wide, and well paved. What are known as 'the boulevards' include the interior, exterior, and military. That which is specifically called *The Boulevard* extends, in an irregular arc on the north side of the Seine, from the Place de la Bastille in the east to the Place de la Madeleine in the west. It includes the Boulevards du Temple, St. Martin, St. Denis, des Italiens, Capuchins, Madeleine, etc., and its length of nearly 3 miles forms the most stirring part of the city. Here may be noted also the magnificent triumphal arches of Porte St. Denis and Porte St. Martin, the former of which is 72 feet in height. On the south side of the Seine the boulevards are neither so numerous nor so extensive, the best known being the Boulevard St. Germain, which extends from Pont Sully to the Pont de la Concorde. The exterior boulevards are so named because they are outside the old *mur d'octroi;* and the military boulevards, still farther out, extend round the fortifications. After the boulevards the most famous line of streets is the Rue de Rivoli, with its somewhat irregular extension in the magnificent Champs Elysées. A second is the Avenue de la Grande Armée and the Rue St. Antoine. These traverse a great part of the city from S. E. to N. W. The Champs Elysées, a driveway about 1½ miles long, and the Avenue du Bois de Boulogne constitute the most fashionable promenades of the city. Other important streets are the Rue Castiglione, Rue de la Paix, Rue de la Chaussée d'Antin, the Rue des Pyramides, and the twelve fine avenues radiating from the Place de l'Etoile. There are six passenger stations for the railways to the various parts of the country, and a railway around the city (the *ceinture*), by means of which interchange of traffic between the differ

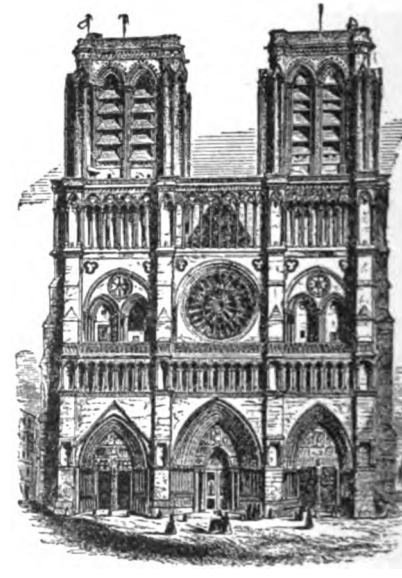


PARIS.— The Place de la Concorde and Montmartre, from the Chamber of Deputies.

ent lines is effected. There are also tramway lines to Versailles, St. Cloud, and other places in the suburbs.

Squares, Parks, etc.— The most notable public squares or *places* are the Place de la Concorde, one of the largest and most elegant squares in Europe, surrounded by fine buildings and adorned by an Egyptian obelisk, fountains, and statues; Place de l'Étoile, in which is situated the Arc de Triomphe, a splendid structure 152 feet in height; the Place Vendôme, with column to Napoleon I; Place des Victoires, with equestrian statue of Louis XIV; Place de la Bastille, with the Column of July; Place de la République, with colossal statue of the Republic, etc. Within the city are situated the gardens of the Tuileries, which are adorned with numerous statues and fountains; the gardens of the Luxembourg, in which are fine conservatories of rare plants; the Jardin des Plantes, in which are the zoölogical gardens, hothouses, museums, laboratories, etc., which have made this scientific institution famous; the Buttes-Chaumont Gardens, in which an extensive old quarry has been turned to good account in enhancing the beauty of the situation; the Parc Monceaux; and the Champs Élysées, the latter being a favorite holiday resort of all classes. But the most extensive parks are outside the city. Of these the Bois de Boulogne, on the west, covers an area of 2150 acres, gives an extensive view towards St. Cloud and Mont Valérien, comprises the race-courses of Longchamps and Auteuil, and in it are situated lakes, an aquarium, conservatories, etc. The Bois de Vincennes, on the east, even larger, is similarly adorned with artificial lakes and streams, and its high plateau offers a fine view over the surrounding country. The most celebrated and extensive cemetery in Paris is Père la Chaise (106½ acres), finely situated and having many important monuments. The Catacombs are ancient quarries which extend under a portion of the southern part of the city, and in them are deposited the bones removed from old cemeteries now built over.

Churches.— Of the churches of Paris the most celebrated is the Cathedral of Nôtre Dame, situated on one of the islands of the Seine, called the Île de la Cité. It is a vast cruciform structure, with a lofty west front flanked by two square towers, the walls sustained by many flying buttresses, and the eastern end octagonal. The whole length of the church is 426 feet, its breadth 164 feet. The foundation of Nôtre Dame belongs to the sixth century; the present edifice dates from 1163; but was restored in 1845. The interior decorations are all modern. The Church of La Madeleine, a modern structure in the style of a great Roman temple, entirely surrounded by massive Corinthian columns, stands on an elevated basement fronting the north end of the Rue Royale; the Church of St. Geneviève, built about the close of the eighteenth century, was after its completion set apart, under the title of the Panthéon, as the burying-place of illustrious Frenchmen; St. Eustache (1532-1637), a strange mixture of degenerate Gothic and Renaissance architecture; St. Germain l'Auxerrois, dating from the fifteenth and sixteenth centuries; St. Gervais; St. Roch; St. Sulpice; Nôtre Dame de Lorette; St. Vincent de Paul, etc. On



The Cathedral of Nôtre Dame, Paris.

the very summit of Montmartre is the Church of the Sacred Heart, a vast structure in mediæval style. The Protestant churches are the Oratoire and Visitation, and chapels belonging to English, Scotch, and American denominations. There are also a Greek chapel and several synagogues.

Palaces and Public Buildings.— Notable among the public buildings of Paris are its palaces. The Louvre, a great series of buildings within which are two large courts, is now devoted to a museum

which comprises splendid collections of sculpture, paintings, engravings, bronzes, pottery, Egyptian and Assyrian antiquities, etc. (see *Louvre*); the palace of the Tuileries, the main front of which was destroyed in 1871 by the Communists, has since been restored, with the exception of its principal façade, the ruins of which have been removed and its site converted into a garden; the Palais du Luxembourg, on the south side of the river, has very extensive gardens attached to it, and contains the Musée du Luxembourg, appropriated to the works of modern French artists; the Palais Royal (which see), is a famed resort; the Palais de l'Élysées, situated in the Rue St. Honoré, with a large garden, is now the residence of the president of the republic; the Palais du Corps Législatif, or Chambre des Députés, is the building in which the chamber of deputies meets; the Palais de l'Industrie, built for the first international exhibition in 1855, is used for the annual *salon* of modern paintings, etc. The Hôtel de Ville is situated in the Place de l'Hôtel de Ville, formerly Place de Grève, on the right bank of the river. It was destroyed by the Communists in 1871, but has now been reërected on the same site with even greater magnificence. It is a very rich example of Renaissance architecture. The Hôtel des Invalides, built in 1670, with a lofty dome, is now used as a retreat for disabled soldiers and is capable of accommodating 5000. It contains the burial place of the first Napoleon. The Palais de Justice is an irregular mass of buildings occupying the greater part of the western extremity of the Île de la Cité. Opposite the Palais de Justice is the Tribunal de Commerce, a quadrangular building enclosing a large court roofed with glass. The Mint (Hôtel des Monnaies) fronts the Quai Conti, on the south side of the Seine, and contains an immense collection of coins and medals. The other principal government buildings are the Treasury (Hôtel des Finances), in the Rue de Rivoli; the Record Office (Hôtel des Archives Nationales). The Exchange (La Bourse) was completed in 1826; it is in the form of a parallelogram, 212 feet by 126 feet, surrounded by a range of sixty-six columns. A distinctive feature are the extensive markets, among the most important of which are the Halles Centrales, where fish, poultry, butcher-meat and garden produce are sold. A notable and unique structure is the Eiffel Tower, built in connection with the Paris Exhibition of 1889. It is a structure of iron lattice-work 984 feet high, and having three stages or platforms (more than 400 feet higher than the Washington Monument). It is as yet the highest structure in the world.

Education, Libraries, etc.—The chief institution of higher education is the academy of the Sorbonne, where are the university 'faculties' (see *France*, section *Education*) of literature and science, while those of law and of medicine are in separate buildings. There are, besides, numerous courses of lectures in science, philology, and philosophy delivered in the Collège de France, and courses of chemistry, natural history, etc., in the museum of the Jardin des Plantes. Among other Parisian schools are the secondary schools or lycées, the most important of which are Descartes (formerly Louis le Grand), St. Louis, Corneille (formerly Collège Henri IV), Charlemagne, Fontanes (formerly Condorcet), De Vanves; the École Polytechnique for military and civil engineers, etc.; Ecole des Beaux Arts; School of Oriental Languages; Conservatoire des Arts et Métiers, and the Conservatoire de Musique. Of the libraries the most important is the Bibliothèque Nationale, the largest in the world. The number of printed volumes which it contains is estimated at 2,500,000, besides 3,000,000 pamphlets, manuscript volumes, historical documents, etc. The other libraries are those of the Arsenal, St. Geneviève, Mazarin, De la Ville, De l'Institut, and De l'Université (the Sorbonne). There are also libraries subsidized by the municipality in all the arrondissements. Among museums, besides the Louvre and the Luxembourg, there may be noted the Musée d'Artillerie, in the Hôtel des Invalides, containing suits of ancient armor, arms, etc.; the Conservatoire des Arts et Métiers; the Trocadéro Palace, containing curiosities brought home by French travelers, casts from choice specimens of architecture, etc.; the new palaces of the Fine Arts, erected 1897-1900; and the Cluny Museum, containing an extensive collection of the products of the art and artistic handicrafts of the middle ages. The chief of the learned societies is the Institute of France (which see).

Hospitals, etc.—There are many hospitals in Paris devoted to the gratuitous treatment of the indigent sick and injured; and also numerous establishments of a benevolent nature, such as the Hôtel des Invalides, or asylum for old soldiers, the lunatic asylum (Maison des Aliénés, Charenton), blind asylums; the deaf and dumb institute (Institution des Sourds-Muets); two hospitals at Vincennes for

wounded and convalescent artisans; the *crèches*, in which infants are received for the day at a small charge; and the *ouvroirs*, in which aged people are supplied with work.

Theaters.—The theaters of Paris are more numerous than those of any other city in the world. The most important are the Maison de l'Opéra, a gorgeous edifice of great size; the Opéra Comique, the Théâtre Français, the Odéon; the Théâtre de la Gaîté, for vaudevilles and melodramas; Théâtre des Folies Dramatiques, Théâtre du Châtelet, Théâtre du Vaudeville, Théâtre des Variétés, Théâtre de la Porte St. Martin, and the Théâtre de l'Ambigu Comique.

Industries and Trade.—The most important manufactures are articles of jewelry and the precious metals, trinkets of various kinds, fine hardware, paperhangings, saddlery and other articles in leather, cabinet-work, carriages, various articles of dress, silk and woolen tissues, particularly shawls and carpets, Gobelin tapestry, lace, embroidery, artificial flowers, combs, machines, scientific instruments, types, books, engravings, refined sugar, tobacco (a government monopoly), chemical products, etc. That which is distinctively Parisian is the making of all kinds of small ornamental articles, which are called *articles de Paris*. A large trade is carried by the Seine both above and below Paris as well as by canals.

Population.— According to approximate estimates, the population of Paris was, in 1474, 150,000; under Henry II (1547-59), 210,000; in 1590, 200,000; under Louis XIV (1643-1715), 492,600; in 1856 (before the annexation of the parts beyond the old *mur d'octroi*), 1,174,346; 1861 (after the annexation), 1,667,841; 1881, 2,269,023; 1901, 2,714,068; 1911, 2,847,229; 1921, 2,863,741.

History.— The first appearance of Paris in history is on the occasion of Cæsar's conquest of Gaul, when the small tribe of the Parisii were found inhabiting the banks of the Seine, and occupying the island now called Île de la Cité. It was a fortified town in 360 A.D., when Julian's army encamped here summoned him to fill the imperial throne. In the beginning of the fifth century it suffered much from the northern hordes, and ultimately fell into the hands of the Franks, headed by Clovis, who made it his capital in 508. In 987 a new dynasty was established in the person of Hugo Capet, from whose reign downwards Paris has continued to be the residence of the kings of France. In 1437 and 1438, under Charles VII, Paris was ravaged by pestilence and famine, and such was the desolation that wolves appeared in herds and prowled about the streets. Under Louis XI a course of prosperity again commenced. In the reign of Louis XIV the Paris walls were leveled to the ground after having stood for about 300 years, and what are now the principal boulevards were formed on their site (1670). Only the Bastille was left (till 1789), and in place of the four principal gates of the old walls, four triumphal arches were erected, two of which, the Porte St. Denis and Porte St. Martin, still stand. Many of the finest edifices of Paris were destroyed during the Revolution, but the work of embellishment was resumed by the directory, and continued by all subsequent governments. The reign of Napoleon III is specially noteworthy in this respect; during it Paris was opened up by spacious streets and beautified to an extent surpassing all that had hitherto been effected by any of his predecessors. The most recent events in the history of Paris are the siege of the city by the Germans in the war of 1870-71, and the subsequent siege carried on by the French national government in order to wrest the city from the hands of the Commune. Paris has been the scene of international exhibitions in 1855, 1867, and 1878, but the most important was that of 1889 in commemoration of the centenary of the French Revolution. In 1900 was held the Exposition Universelle. In the European war, 1914-18, the Germans endeavored to reach the city, but were repulsed by the Allied armies. Paris was bombed from the air on several occasions, and was shelled by long-distance gun from the forest of St. Gobain, March, 1918.

Paris (par'is), a city, county seat of Edgar Co., Illinois, 36 miles s. of Danville. It has car shops and broom factories, etc. Pop. 7985.

Paris, a city, county seat of Bourbon Co., Kentucky, on Stoner Creek, 19 miles N. E. of Lexington. Its industries include tobacco, livestock and blue-grass seed. Pop. (1920) 6310.

Paris, a city, county seat of Lamar Co., Texas, on the Texas Pacific and other railroads, 93 miles N. E. of Dallas. It has cotton gins and compresses, oil mills, furniture factories, etc. Pop. (1910) 11,269; (1920) 15,040.

Paris, in Greek mythology, also called ALEXANDER, the second son of Priam, king of Troy, by Hecuba. His mother dreamed before his birth that she had brought forth a firebrand, which was interpreted to mean that he would cause the destruction of Troy. To prevent this

the child was exposed on Mount Ida, where he was discovered by a shepherd, who brought him up as his own son. Here his grace and courage commended him to the favor of Œnone, a nymph of Ida, whom he married. At the marriage of Peleus and Thetis a dispute arose whether Hera, Athena, or Aphroditē was the most beautiful, and as such entitled to the golden apple. Paris was chosen judge, and decided in favor of Aphroditē, who had promised him the fairest woman in the world for his wife. Subsequently he visited Sparta, the residence of Menelaus, who had married Helena (or Helen), the fairest woman of the age, whom he persuaded to elope with him. This led to the siege of Troy, at the capture of which city Paris was killed by an arrow.

Paris, Louis Albert Philippe d'Orléans, Comte de, son of the Duc d'Orleans, and grandson of Louis Philippe, born in 1838. After the revolution of 1848 he resided chiefly in Claremont, England, where he was educated by his mother. During the American Civil war of 1861 he, along with his brother the Duc de Chartres, volunteered into the northern army, and served for some time on the staff of General McClellan. On his return to Europe the following year he married his cousin the Princess Marie Isabelle, eldest daughter of the Duc de Montpensier. After the Franco-German war he was admitted a member of the first national assembly. The Comte de Paris was recognized by the royalists as head of the royal house of France. Under the expulsion bill of 1886 he, along with the other princes, was forbidden to enter France. He published a *History of the Civil War in America*, and a work on *English Trade-unions*. He died in England in 1894.

Paris, Matthew, an English historian, born about 1195; died in 1259. He entered the Benedictine monastery of St. Albans, and in 1235 succeeded Roger of Wendover as chronicler to the monastery. He was very intimate with Henry III, and had a large number of influential friends besides. In 1248 he went on an ecclesiastical mission to Norway. He is characterized as at once a mathematician, poet, orator, theologian, painter, and architect. His principal work is his *Historia Major* (or *Chronica Majora*), written in Latin, and comprising a sketch of the history of the world down to his own times, the latter portion (1235-59) being, however, the only part exclusively his; the *Historia Anglorum*, called also *Historia Minor*, a sort of abridgment of the former; and also *Lives of the Abbots of St. Albans, Kings of Mercia*, etc.

Paris, Treaties of. Of the numerous treaties bearing this designation a few only of the most important can be mentioned here. On February 10, 1763, a treaty of peace was signed between France, Spain, Portugal, and England, in which Canada was ceded to Great Britain. On February 6, 1778, was signed that between France and the United States, in which the independence of the latter country was recognized. A treaty was signed between Napoleon I and the allies, ratified April 11, 1814, by which Napoleon was deposed and banished to Elba. The treaty for the conclusion of peace between Russia, on the one hand, and France, Sardinia, Austria, Turkey, and Great Britain, on the other, at the end of the Crimean war, was ratified March 30, 1856. The treaty of peace with Germany, at the end of the Franco-German war, May 10, 1871, by which France lost a great part of her Rhine provinces. The treaty of peace between the United States and Spain in 1899, by which Spain lost her colonial possessions in the West Indies and the Pacific.

Paris, University of, came into existence in the beginning of the thirteenth century, and was long the most famous center of learning in Europe. It was suppressed by a decree of the Convention in 1793.

Paris Basin, in geology, the great area of tertiary strata on which Paris is situated. Besides a rich fossil fauna of marine and fresh-water mollusca, the remains of mammals are abundant and interesting from their affinity to living forms.

Paris Blue, a bright blue obtained by exposing rosaniline, aniline and some benzoic acid to a temperature of 180° C.

Paris Green, a preparation of copper and arsenic employed on artificial flowers, in wall-papers, and as an insecticide on plants.

Parish (par'ish), a district marked out as that belonging to one church, and whose spiritual wants are to be under the particular charge of its own minister; or, to give the sense which the word often has in acts of Parliament, a district having its own offices for the legal care of the poor, etc. Parishes have existed in England for more than a thousand years. They were originally ecclesiastical divisions, but now, in England especially, a parish is an important subdivision of the country for purposes of local self-government, most of the local rates and taxes being confined within that

area, and to a certain extent self-imposed. In Scotland the division into parishes was complete about the beginning of the thirteenth century, and this division is also recognized for certain civil purposes as well as for purposes purely ecclesiastical. In the United States a parish is a body of people united in one church organization. In Louisiana the counties are called parishes.

Parish Clerk is an officer in the Church of England, whose principal duties are to read the responses to the minister. The appointment is generally made by the incumbent, and the emoluments consist of salaries and fees on marriages, burials, etc.

Park (pärk), in a legal sense, a large piece of ground enclosed and privileged for wild beasts of chase, by the monarch's grant, or by prescription. The only distinction between a *chace* and a *park* was, that the latter was enclosed, whereas a chace was always open. The term now generally applies to ornamental grounds connected with a gentleman's residence or public grounds devoted to recreation. The latter are generally in or near a large town or city. Within recent years the establishing of city parks has made great progress in the United States, one of the earliest and most famous being the large and picturesque Fairmount Park of Philadelphia. Within the present century the development of pleasure grounds of this kind has gone on very actively in the cities of New York, Chicago, Boston and others of the large cities of this country and in many of the smaller ones. Great national and state parks have also been formed, chief among the former being the Yellowstone and Yosemite national parks. See *National Parks*.

Park City, a town in Knox County, Tennessee; a new place, organized in the first decade of the twentieth century. Pop. 5126.

Park, MUNGO, an African traveler, born near Selkirk in Scotland, in 1771; died in 1806. He was educated at Edinburgh for the medical profession; received an appointment as assistant-surgeon on board an East Indiaman and made a voyage to India. Returning to England in 1793 he was engaged by the African Society to trace the course of the Niger. He reached the Gambia at the end of 1795, and advancing northeastward arrived at the Niger near Segu. After exploring part of the course of the river he returned home, and published his *Travels in the Interior of Africa* in 1799. He settled at Peebles as a country doctor, but in 1805 accepted command of a government expedition to the Niger. Having advanced from Pisania on the Gambia to Sansanding on the Niger, he built a boat at the latter place, with the intention of following the Niger to the sea. It was afterwards ascertained that the expedition advanced down the river as far as Boussa, where it was attacked by the natives. It is supposed that Mungo Park was drowned in his efforts to escape. The *Journal* of his second expedition as far as the Niger was published in 1815.

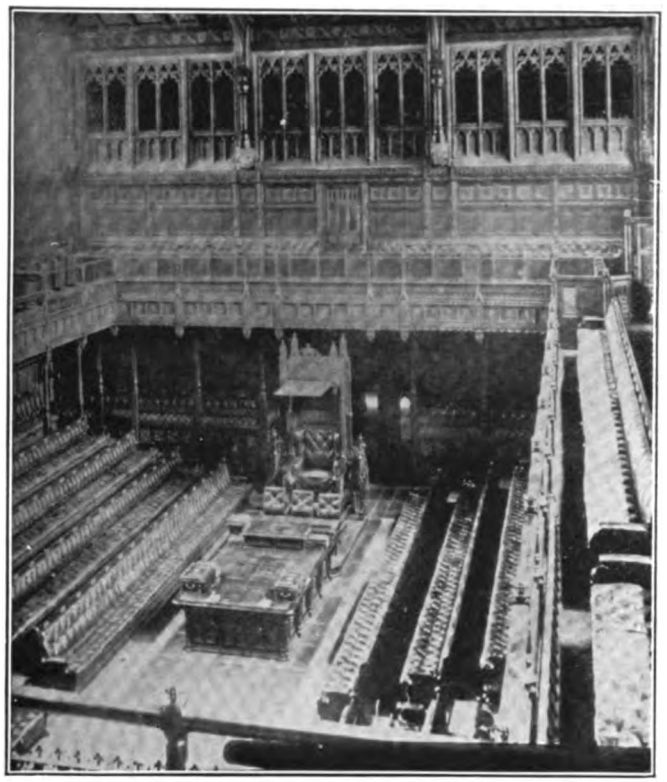
Parker (pär'ker), ALTON BROOKS, judge, born at Cortland, New York, in 1852. Studied law, practiced at Kingston, and became chief judge of the Court of Appeals of New York in 1898. He took an active part in Democratic politics, and in 1904 received the Democratic nomination for President of the United States. He was defeated by Theodore Roosevelt.

Parker, SIR GILBERT (1862-), a Canadian novelist, born at Camden East, Ontario. He traveled in the South Sea Islands, in the East, in Europe, Asia, Egypt and elsewhere. In 1903 he organized the first Imperial Universities Conference in London; was member of Parliament for Gravesend 1900-18. Author of *The Seats of the Mighty, The Battle of the Strong, The Right of Way, Donovan Pasha, Wild Youth,* and many other novels, also *The World in the Crucible* (1915), a war book.

Parker, HORATIO WILLIAM (1863-1919), an American composer, born at Auburndale, Mass. He won the Metropolitan Opera prize of $10,000 for his opera *Mona* in 1911; and the National Federation of Women's Clubs prize of $10,000 for his opera *Fairyland.* He wrote a number of cantatas and oratorios, notably *Hora Novissima.*

Parker, JOHN HENRY, an English archæologist, born in 1806; died in 1884. He was a well-known publisher in Oxford, and in 1870 became keeper of the Ashmolean Museum. He devoted much time and labor to excavations in Rome.

Parker, MATTHEW, Archbishop of Canterbury, born at Norwich, in 1504; died in 1575. He was educated at Cambridge, and after having been licensed to preach was appointed dean of Stoke College in Suffolk. He was also made a king's chaplain and a canon of Ely. In 1544 he was appointed master of Corpus Christi College, Cambridge, and elected vice-chancellor of that university the following year. When Queen Mary succeeded to the throne Parker was deprived of his offices, and



THE HOUSE OF COMMONS

THE HOUSE OF LORDS

Interior views taken in the Houses of Parliament, London, England.

remained in concealment until the accession of Elizabeth in 1558. By royal command he was summoned to Lambeth, and appointed Archbishop of Canterbury. It was while he held this office that he had what is known as the *Bishop's Bible* translated from the text of Cranmer, and published at his own expense. He was the founder of the Antiquarian Society, a collector of MSS., which he presented to his college, and editor of the *Chronicles of Walsingham, Matthew Paris,* and *Roger of Wendover.*

Parker, THEODORE, an American divine, son of a Massachusetts farmer, born at Lexington in 1810; died at Florence in 1860. He studied at Harvard University, and in 1837 was settled as a Unitarian preacher at West Roxbury. Although his doctrine was accounted heterodox, yet such was his eloquence and ability that he soon became famous as a preacher and lecturer over New England. In 1843 he visited England, France, Italy, and Germany, and settled as a preacher in Boston on his return. He was a prominent advocate of the abolition of slavery. The principal of his published works are: *Occasional Sermons and Speeches;* and *Sermons on Theism, Atheism, and the Popular Theology.*

Parker, SIR HYDE, a British admiral, born about the year 1711; fought against the French, Spaniards, and Dutch. In 1783 he perished on his way to the East Indies.

Parker, SIR WILLIAM, a British admiral, born in 1781; died in 1866; entered the naval service, greatly distinguished himself by the capture of the *Belle-Poule,* a French frigate, and in 1809 made himself master of the citadel of Ferrol. In 1841 he took command of the fleet operating against China; forced the entrance of the Yang-tse-kiang, and appeared before Nanking, where terms of peace were agreed upon.

Parkersburg, a city, county seat of Wood Co., West Virginia, on the Ohio River, at the mouth of the little Kanawha. It has an extensive trade in petroleum, and has large lumber mills, oil refineries, iron and steel, brick and tile works, and manufactures of oil-well supplies, shovels, furniture, insulation porcelain, glass, shoes, mattresses, boilers, clothing, building supplies, raincoats, chemicals, etc. Pop. (1910) 17,842; (1920) 20,050.

Parkman (park'man), FRANCIS, historian, born at Boston, Massachusetts, in 1823; was graduated at Harvard College in 1844. After spending a year in Europe, he made a trip to the Rocky Mountains and published *The California and Oregon Trail,* and *History of the Conspiracy of Pontiac.* Taking up the history of France in America as his lifework, he wrote a series of able and popular works, admired for their graces of style and graphic delineation of the subject. They include *The Old Régime in Canada* (1864), *The Pioneers of France in the New World* (1865), *The Jesuits in North America* (1866), *The Discovery of the Great West* (1869), *Count Frontenac and New France under Louis XIV* (1878), *Montcalm and Wolfe* (1884), and *A Half Century of Conflict* (1892). He died in 1893.

Parkhurst (park'hurst), CHARLES HENRY, reformer, born at Framingham, Massachusetts, in 1842. He studied theology in Germany and in 1880 became pastor of the Madison Square Presbyterian Church, New York. In 1891, as president of the Society for the Prevention of Crime, he began an attack on the police methods in New York, and was prominent in the investigation that followed.

Parliament (pär'li-ment; French, *parlement,* from *parler,* to speak), the supreme legislative assembly and court of law in Britain. In the article *Britain* the power and organization of Parliament are dealt with, while here its procedure and regulations are noted. When a new Parliament is summoned, and the two houses have met on the appointed day in their respective chambers, the lord-chancellor requires the presence of the Commons in the Upper House to hear His Majesty's commission read. When this is done the Commons withdraw to the Lower House and choose a speaker, previous to the election of whom the clerk of the House acts as speaker. After his election the administration of the requisite oath to the members is then proceeded with in both Houses. When most of the members have been sworn, the Commons are summoned to the Upper House, and the purposes for which Parliament has been assembled are then declared, either by the king in person or by his representative. After the royal speech, containing this declaration, has been read in presence of the members of both Houses, a reply to the address is moved in each house separately.

A house for the transaction of business must consist of at least forty members, otherwise the speaker will not take the chair. The speaker of the House of Commons cannot take part in a debate in the House, and can only speak on

questions of order or practice. He can, however, vote in cases where the votes are equally divided, or in committees of the whole house. The lord-chancellor is *ex officio* the speaker of the House of Lords, and he may both speak and vote in the House. When a division takes place upon a motion (that is, when a vote is taken on the motion) the practice is that those assenting to and those dissenting from the motion before the House each retire into a separate lobby provided for that purpose, and are counted as they re-enter the house, by two tellers on either side, who are appointed by the speaker. The mover of a motion puts it in writing, and delivers it to the speaker, who, when it has been seconded, puts it to the House, after which it cannot be withdrawn without the consent of the House. There are various ways in which a motion may be superseded, such as by the adjournment of the House, by the motion that the orders of the day be now read, and by the moving of the 'previous question' (which see). The House is adjourned when it is found that there are fewer than forty members present. Order is generally enforced by the chair, and in extreme cases of obstruction or the like, the offender is 'named' and suspended, or otherwise dealt with at the discretion of the house. Irrelevancy or tedious repetition may also be dealt with by the chair, and to prevent debates being endlessly protracted, a measure called the 'closure,' or 'cloture,' was finally adopted. See *Closure*.

The method of making laws is much the same in both Houses. In order to bring a private bill into the House of Commons it is first necessary to prefer a petition setting forth the aims of the measure, and otherwise comply with the standing orders of the House. When this is done the House, on the motion of a member, directs the bill to be introduced. The second reading of the bill is then fixed, and after being read it is referred to a select committee, upon which devolves all the actual work, in the shape of amendment, acceptance, or rejection. The committee on completion of its labors reports to the House, and the bill may then be read a third time and passed. Private bills include all those of a purely local character, such as the measures promoted by municipal corporations, private individuals, railway, gas, and water companies, etc. In public matters a bill is brought in upon motion made to the House without any petition. The bill is read a first time, and after a convenient interval a second time; and after each reading the speaker puts the question whether it shall proceed any further. If the opposition succeeds the bill must be dropped for that session. After the second reading it is referred to a committee, which is either selected by the House or the House resolves itself into a committee of the whole House. A committee of the whole House is composed of every member, and is presided over by a chairman other than the speaker—the speaker having vacated the chair, and the mace that lies before him having been removed. In these committees the bill is debated clause by clause, amendments made, the blanks filled up, and sometimes the bill entirely new-modeled. After it has gone through the committee the chairman reports to the House such amendments as have been made, and then the House reconsiders the whole bill again. When the House has agreed or disagreed to the amendments of the committee, the bill is then ordered to be reprinted. It is then read a third time, and amendments are at this stage of its progress sometimes made. The speaker then puts the question whether the bill shall pass. If this be agreed to the title is settled, and the bill carried to the bar of the Upper House, where it is received by the chancellor. It there passes through the same forms as in the other House, and if rejected no more notice is taken of it. But if it be agreed to the Lords send a message by one of the clerks, or on rare occasions by two masters in chancery to that effect, and the bill remains with the Lords. If any amendments are made, such amendments are sent down with the bill to receive the concurrence of the Commons. If the Commons disagree to the amendments, and both Houses in conference fail to agree, then the bill is dropped. If, however, the Commons agree to the amendments the bill is sent back to the Lords by one of the members, with a message to acquaint them therewith. The same forms are observed, *mutatis mutandis*, when the bill begins in the House of Lords.

The royal assent to bills may be given by the king in person; in which case he attends the House of Lords in state; or the royal assent may also be given under letters patent and notified in his absence, to both Houses assembled together in the Upper House, by commissioners, consisting of certain peers named in the letters. When the bill has received the royal assent in either of these ways it is then, and not before, a statute or act of parliament. All proceedings relating to the public income or expenditure originate in the Commons, a committee of the whole House, called the committee of supply, dis-

cussing and passing the various estimates during the session. These are all consolidated in an appropriation bill at the end of the session sent to the House of Lords for approval, receive the royal assent and become law.

Within recent years, however, a vigorous movement has been made to limit the power of the House of Lords in dealing with financial measures. This movement reached a high state of development in 1910, when it became evident that the hereditary rights of peers to legislative power would have to be curtailed and the constitution of the House of Lords modified, the people sustaining the ministry in a revolt against the existing conditions. As a result a bill was passed by the House of Commons in 1911, and accepted after vigorous opposition by the House of Lords, greatly curtailing the powers of the latter body and making the lower House the dominant power. The right of rejecting or amending money bills was taken from the House of Lords and the scope of what constituted a money bill was extended to include one connected in almost any way with the finances. In addition, if any bill not connected with finance should pass the lower House in three successive sessions of that body it was not to be subject to amendment or rejection by the Lords, provided that two years had passed between its introduction and its third passage. The duration of a Parliament was also limited to five years, instead of seven years, as formerly.

The Parliament of France resembled that of England in being originally a convocation of the great vassals of the crown. St. Louis was the first to introduce into this body counsellors of inferior rank, chiefly ecclesiastics. The parliament had judicial as well as political functions, and after 1304, when it became a permanent court at Paris, the barons rarely attended and lawyers were its chief members and officials. It remained the chief tribunal of the country, except for a short period after 1771, until the Revolution, its most important power being that of registering the edicts of the sovereign and thus giving them the force of law. It could protest against a tyrannous law and was thus able to modify the otherwise absolute power of the monarchs.

Parma (pär'ma), a city of North Italy, capital of the province of Parma, on the small river Parma, 72 miles southeast of Milan. It is surrounded by a line of ramparts and bastions, and though an old town has quite a modern aspect. The principal squares are four, and one of them, the Piazza Grande, is large and handsome. Among the more important buildings are the cathedral, begun in 1058, a cruciform building with a dome, an excellent example of the Lombard-Romanesque style, the interior of the dome being painted in fresco by Correggio; the baptistery, a structure of marble; the Church of La Steccata; the Church of San Giovanni, which, with other churches and buildings, contains paintings by Correggio and Mazzuoli, who were born here; the ducal palace, now the prefecture; the Palazzo dello Pilotta, comprising the museum of antiquities, picture-gallery, and library (more than 300,000 vols. and 5000 MSS.); and the university (about 200 students). Parma was originally an Etruscan town, and became a Roman colony in 183 B.C. The manufactures are of silk, cottons, woolens, felt hats, etc. Pop. 53,781.—The province lies on the right bank of the Po; area, 1253 square miles; pop. 294,159. It is watered chiefly by the Taro, the Parma, and the Enza, all of which fall into the Po.

Parma, DUCHY OF, formerly an independent state of Upper Italy, but since 1860 incorporated in the Kingdom of Italy, and divided into the provinces of Parma and Piacenza. It comprehended the three duchies of Parma proper, Piacentia or Piacenza, and Guastalla, and had an area of about 2266 square miles. Parma anciently formed part of Gallia Cispadana and Liguria. Charlemagne made a present of it to the pope; but it subsequently became an independent republic, and in the sixteenth century was erected into a duchy which was long ruled by the Farnese dukes. The victories of the French in Italy in the beginning of this century enabled Napoleon to seize the duchy and attach it to his Kingdom of Italy. After Napoleon's downfall it fell to his widow, the Archduchess Maria Louisa, for life, and thereafter to the Duke of Lucca.

Parmegianino (pär-mej-â-nē'nō). Same as *Mazzola.*

Parmenides (par-men'i-dēz), a Greek philosopher, native of Elea in Italy, and head of the Eleatic school, flourished about the middle of the fifth century B.C. In 450 he went to Athens, accompanied by his pupil Zeno, and there became acquainted, according to Plato, with Socrates. Like Xenophanes, he developed his philosophy in a didactic poem *On Nature,* of which about 160 lines are still extant. One part of this poem dealt with what *is* or 'Truth,' and the second part with what only *appears* or 'Opinion.'

Parmesan Cheese (pär-me-zan'), a cheese mad-

in the neighborhood of Parma of skimmed milk by a peculiar process, flavored with saffron, and celebrated for its keeping qualities. Indeed, it becomes so hard as to require to be grated when used.

Parmigiano (pär-mē-jä'nō). See *Mazzola.*

Parnahyba (pär-nä-ē'bä), a river of Brazil, which rises in the northeast of the province of Goyaz, flows northeast, forms the boundary between the provinces of Piauhi and Maranhão, and falls into the Atlantic below Parnahyba; total course about 800 miles. The port of Parnahyba admits only small vessels. Pop. about 12,000.

Parnassus (pär-nas'sus), or LIAKU'RA, a mountain of Greece, situated in Phocis, 65 miles northwest of Athens. It has two prominent peaks, one of which was dedicated to the worship of Bacchus, and the other to Apollo and the Muses, while on its southern slope was situated Delphi and the Castalian fount. Its height is 8068 feet, and a magnificent view is obtained from its top.

Parnell (pär'nel), CHARLES STEWART, born at his father's estate of Avondale, County Wicklow, Ireland, in 1846, was connected on his father's side with a family that originally belonged to Congleton, Cheshire, and whose members included Parnell the poet, and Sir John Parnell, chancellor of the exchequer in Grattan's Parliament; while his mother was the daughter of Admiral Stewart of the United States navy. He was educated at Magdalen College, Cambridge; became member of parliament for Meath in 1875; organized the 'active' Home Rule party, and developed its obstruction tactics; and in 1879 formally adopted the policy of the newly-formed Land League, was an active member of it, and was chosen president of the organization. In 1880 he was returned for the City of Cork, and was chosen as leader of the Irish party. In the session of 1881 he opposed the Crimes Act and the Land Act; was arrested (October 13th) under the terms of the former, along with other members of his party; and was lodged in Kilmainham Jail, from whence he was not released until the following May. In 1883 he was the recipient of a large money testimonial (chiefly collected in America), and in this year was active in organizing the newly-formed National League. At the general election of 1885 he was re-elected for Cork, and next year he and his followers supported the Home Rule proposals introduced by Mr. Gladstone, while he also brought in a bill for the relief of Irish tenants that was rejected. In 1887 he and other members of his party were accused by the *Times* newspaper of complicity with the crimes and outrages committed by the extreme section of the Irish Nationalist party. To investigate this charge a commission of three judges was appointed by the government in 1888, with the result that, after much evidence had been heard on both sides, a report was laid before Parliament in February, 1890, Mr. Parnell being acquitted of all the graver charges. He died in 1891.

Parnell, THOMAS, poet, born in Dublin in 1679; died in 1717. He was educated at Trinity College, and, taking orders in 1705, was presented to the archdeaconry of Clogher, but he resided chiefly in London. He was at first associated with Addison, Congreve, Steele, and other Whigs; but towards the latter part of Queen Anne's reign he joined the Tory wits, of whom the most notable were Swift, Pope, Gay, and Arbuthnot. He afforded Pope some assistance in his translation of Homer, and wrote the *Life* prefixed to it. By Swift's recommendation he obtained a prebend in the Dublin Cathedral and the valuable living of Finglass. After his death a collection of his poems was published by Pope in 1721.

Parochial Board (pa-rō'ki-al), in Scotland, a body of men in a parish elected by the payers of poor-rates to manage the relief of the poor, a duty which, in England, is performed by overseers, and in some cases by the guardians of the poor.

Parody (par'u-di), a kind of literary composition, usually in verse, in which the form and expression of grave or serious writings are closely imitated, but adapted to a ridiculous subject or a humorous method of treatment.

Parole (pa-rōl'), a promise given by a prisoner of war that he will not try to escape if allowed to go about at liberty; or to return, if released, to custody at a certain time if not discharged; or not to bear arms against his captors for a certain period; and the like.

Paros (pă'ros), an island in the Grecian Archipelago, one of the Cyclades, 4 miles west of Naxos; length 13 miles; breadth 10 miles. It is generally mountainous; but the soil, though often rocky, is fertile, and in some places well cultivated Its marble has been famous from ancient times, and is the material of which some of the most celebrated pieces of statuary are composed. Paros was the birthplace of the poet Archilochus and the painter Polygnotus. Parikia, a seaport on the northwest coast, is the chief town; pop. 2200. Pop. of island. 7740.

Parotid Gland (pa-rot'id), in anatomy, one of the salivary glands, there being two parotids, one on either side of the face, immediately in front of the external ear, and communicating with the mouth by a duct.

Parquetry (pär'ket-ri), a species of inlaid woodwork in geometric or other patterns, and generally of different colors, principally used for floors.

Parr, a young salmon that has not yet left fresh water for the sea.

Parr, CATHARINE (1512-48), the sixth and last wife of Henry VIII of England. She was a pious and charitable woman and wrote a discourse on *The Lamentation of a Sinner*. After the king's death she married Sir Thomas (later Lord) Seymour of Sudeley (1547).

Parr, SAMUEL (1747-1825), a noted English scholar. He was educated at Harrow and Cambridge; taught successively in the grammar schools of Stanhope, Colchester, and Norwich; and in 1783 became perpetual curate of Hatton in Warwickshire. Here he engaged in literature, and became noted among his contemporaries as a classical purist and bitter polemic.

Parr, THOMAS, better known as *Old Parr*, was born, it is said, in 1483 at Winnington, Shropshire, and died in 1635, he being then in his 152d year. A metrical account of his career was published in 1635 by John Taylor, the 'water-poet,' and he was buried in Westminster Abbey, where a monument records his longevity. His age, however, has been disputed, and doubtless he was not nearly so old as represented.

Parrakeet (par'a-kēt), or PARAKEET, a small parrot, usually with a long, pointed tail. See *Parakeet*.

Parrhasius (par-rā'she-us), a Greek painter, born at Ephesus, flourished about 420 B. C. Several of his pictures are mentioned by ancient authors, but none of them have been preserved.

Parricide (par'i-sīd), the murder of a close relative, especially a father or mother; or one who murders a father or mother, or other close relative. Severe punishment was meted out to the parricide in ancient Rome. In English and American law the parricide is not differentiated from the murderer.

Parrish, EDWARD (1822-1872), an American pharmacist, born in Philadelphia, graduate of the Philadelphia College of Pharmacy. He established a school of practical pharmacy in 1849, and was made professor of materia medica in the College of Pharmacy in 1864, and professor of practical pharmacy in 1867. He won renown for his 'Parrish's Chemical Food,' a compound syrup of phosphate of iron.

Parrish, MAXFIELD (1870-), an American painter and illustrator, born in Philadelphia in 1870. He studied at the Pennsylvania Academy of Fine Arts and the Drexel Institute, Philadelphia, and was a pupil of Howard Pyle. Some of the many books which he has richly illustrated are *The Golden Age*, Eugene Field's *Poems of Childhood*, and *Mother Goose Rhymes*, Irving's *Knickerbocker History of New York*. His mural decorations include the well-known 'Old King Cole' made for the former Knickerbocker Hotel, New York, panels in the Curtis Building, Philadelphia, and other decorations in hotels in Chicago and San Francisco. He was elected to the National Academy of Design in 1906.

Parrot (par'ut), a name common to birds of the family Psittacidæ, of the order Scansores or climbers. The bill is hooked and rounded on all sides, and is much used in climbing. The tarsi are generally short and strong, the toes being arranged two forwards and two backwards. The tongue, unlike that of most other birds, is soft and fleshy throughout its whole extent. The wings are of moderate size, but the tail is often elongated, and in some cases assists in climbing. The plumage is generally brilliant. Parrots breed in hollow trees, and subsist on fruits and seeds. Several species can not only imitate the various tones of the human voice, but also exercise in some cases actual conversational powers. Some live to a great age, instances being known of these birds reaching seventy and even ninety years. The species are numerous, and are known under the various names of parrots, parakeets, macaws, lorikeets, lories, and cockatoos (see these articles), the name parrot, when used distinctively, being generally applied to species of some size, that have a strongly hooked upper mandible and a short or medium-length tail. They are natives of both tropical and subtropical regions, and even extend northwards into the United States, and south to the Straits of Magellan, New Zealand, and Tasmania. The best-known species is the Gray Parrot (*Psittacus erithacus*) of Western Africa, which can be most easily trained to talk.

Parrot-fish, a fish of the genus *Scarus*, family Scaridæ, remarkable for the beak-like plates into which the teeth of either jaw are united, and for their brilliancy of color, from one

or other of which circumstances they have received their popular name. Most of the species are tropical, but one, *S. cretensis*, the *scarus* of the ancients, and esteemed by them the most delicate of all fishes, is found in the Mediterranean.

Parry (par'ri), Sir William Edward, born at Bath in 1790; died in 1855. He joined the navy in 1803, became lieutenant in 1810, took part in the successful expedition up the Connecticut River in 1813, and continued on the North American station till 1817. In the following year he was appointed commander of the *Alexander* in an expedition to the Arctic regions under Sir John Ross, and during the succeeding nine years he commanded various expeditions on his own account in efforts to find a northwest passage, and to reach the north pole. He afterwards filled various government situations, became rear-admiral of the white, lieutenant-governor of Greenwich Hospital, and received the honor of knighthood. He published several volumes, in which he narrated his voyages and adventures.

Parsees (pär-sēz'), the name given in India to the fire-worshiping followers of Zoroaster, chiefly settled in Bombay, Surat, etc., where they are amongst the most successful merchants. They have a great reverence for fire in all its forms, since they find in it the symbol of the good deity Ahurâ-Mazda (Ormuzd). To this divinity they have dedicated 'fire-temples,' on whose altar the sacred flame is kept continually burning. Benevolence is the chief practical precept of their religion, and their practice of this finds its evidence in their many charitable institutions. One of the most curious of their customs is in the disposal of their dead. For this they erect what are called 'towers of silence,' built of stone, about 25 feet high, and with a small door to admit the corpse. Inside is a large pit with a raised circular platform round it on which the body is exposed that it may be denuded of flesh by vultures, after which the bones drop through an iron grating into the pit below. The number of Parsees in India is about 100,000. See *Guebres*.

Parsley (pärs'li), a plant of the nat. order Umbelliferæ, one species of which, the common parsley (*Petroselinum sativum*), is a well-known garden vegetable, used for communicating an aromatic and agreeable flavor to soups and other dishes. It is a native of Sardinia, introduced into Britain about the middle of the sixteenth century, and now widely grown. A variety with curled leaflets is generally preferred to that with plain leaflets, as being finer flavored. Hamburg parsley, a variety with a large white root like a carrot, is cultivated for its roots, and much in the same way as carrots or parsnips.

Parsnip (pärs'nip), a plant of the genus *Pastinăca*, nat. order Umbelliferæ, the *P. sativa* (common or garden parsnip), of which there are many varieties. It is a tall, erect plant, with pinnate leaves and bright-yellow flowers, common throughout England and in most parts of Europe and America, and much cultivated for its roots, which have been used as an esculent from a very early period. They are also cultivated as food for the use of cattle.

Parson (pär'sun), in English ecclesiastical law, is the rector or incumbent of a parish; also, in a wider sense, any one that has a parochial charge or cure of souls.

Parsons, a city of Labette Co., Kansas, 137 miles s. by w. of Kansas City. The extensive offices and car shops of the Missouri, Kansas & Texas R. R. are here (4000 employees). Also has iron works, shirt factories, candy factories, flour mills, etc. State hospital for epileptics is here. Pop. (1910) 12,463; (1920) 16,028.

Parsons, a borough of Luzerne Co., Pennsylvania, adjoining Wilkes-Barre. Has silk and coal interests. Pop. (1920) 5628.

Parsonstown (pärs'nz-toun), formerly called Birr, a market-town in King's county, Ireland, on the river Little Brosna, about 90 miles s.w. of Dublin. The modern parts are well built and regularly laid out in streets and squares. Birr Castle, the seat of the Earl of Rosse, with its famous telescope, closely adjoins the town. Pop. 4438.

Parterre (pär-tär'), a system of garden flower-beds arranged in a design, with turf or gravel spaces intervening. Also applied to the pit of a French theater.

Parthenogenesis (pär-the-nō'jen-e-sis; Greek, *parthenos*, a virgin: *genesis*, birth), in zoölogy, a term applied to the production of new individuals from virgin females by means of ova, which are enabled to develop themselves without the contact of the male element. We find several examples of this peculiar phenomenon among insects. The most notable are the aphides or plant-lice, whose fertilized ova, deposited in the autumn, lie without apparent development throughout the winter, and in the following spring produce modified females only. These females, without sexual contact with the males

give birth to a second generation like to themselves, and this form of reproduction is indefinitely repeated. In the succeeding autumn, however, male insects appear in the brood, and the ova are again impregnated with the male element. In this case parthenogenesis has more the appearance of alternate generation. Perhaps the truest instance of parthenogenesis is found in the unfertilized queen-bee, which deposits eggs out of which male or drone-bees are hatched. The eggs which produce neuters or females are impregnated in the usual way, but the eggs which produce the males are not fertilised. In the silkworm moth certain females, without fertilization, produce eggs from which ordinary larvæ are duly developed.

Parthenon (pär'the-non; Gr., from *parthenos*, a virgin — *i.e.*, Athena or Minerva), a celebrated Grecian temple of Athena, on the Acropolis of Athens, one of the finest monuments of ancient architecture. It is built of marble, in the Doric style, and had originally 8 columns on each of the two fronts, with 17 columns on the sides, or 46 in all, of which 32 are still standing; length 228 feet, breadth 101, and height to the apex of the pediments 64 feet; height of columns 34 feet 3 inches. The pediments were filled with large statues, the metopes adorned with sculptures in relief. After serving as a Christian church and as a mosque, it was rendered useless for any such purpose in 1687 by the explosion of a quantity of gunpowder which the Turks had placed in it during the siege of Athens by the Venetians. Though the more precious pieces of sculpture have been dispersed among various European collections (see *Elgin Marbles*), the Parthenon still bears an imposing aspect.

Parthia (pär'thi-a), in the widest sense, was the Parthian Empire, lying between the Euphrates, the Oxus, the Caspian Sea, and the Arabian Sea. In the narrowest sense Parthia was the small country originally inhabited by the Parthians, and situated in the north-western part of the modern Persian province of Khorasan. The Parthians were of Scythian origin, fought only on horseback, and were celebrated for their skill in archery. They were subject successively to Persians, Macedonians and Syrians, and finally developed an important empire extending to the Euphrates, and resisting the Romans with various fortune. The Parthian dynasty, founded by Arsaces (256 B.C.), was succeeded by the Sassanidæ, the latter being founded by Artaxerxes (214 A.D.), a Persian, who conquered all Central Asia. These again were followed by the conquering Mohammedans. See *Persia*.

Participle (pär'ti-si-pl; Latin, *participium*), in grammar a part of speech, so called because it partakes of the character both of a verb and an adjective. The participle differs from the adjective in that it implies time, and therefore applies to a specific act, whereas the adjective designates only an attribute, as a habitual quality or characteristic, without regard to time. When we say, 'he has *learned* his lesson,' we have regard to a specific act done at a certain time; but in the phrase 'a *learned* man,' *learned* designates a habitual quality. In the former case *learned* is a participle; in the latter, an adjective. There are two participles in English: the present — ending in *-ing*, and the past — ending, in regular verbs, in *-ed*.

Partick (pär'tik), a police burgh of Scotland, county of Lanark, on the Kelvin and the Clyde, adjoining Glasgow on the west. It has flour-mills, engineering works, shipbuilding yards, etc. Pop. (1911) 66,845.

Particles (pär'ti-klz), such parts of speech as are incapable of any inflection, as, for instance, the preposition, conjunction, etc.

Partnership (pärt'nėr-ship) is the association of two or more persons for the purpose of undertaking and prosecuting conjointly any business, occupation, or calling; or a voluntary contract by words or writing, between two or more persons, for joining together their money, goods, labor, skill, or all or any of them, upon an agreement that the gain or loss shall be divided in certain proportions amongst them, depending upon the amount of money, capital, stock, etc., furnished by each partner. Partnership may be constituted by certain acts connected with the undertaking apart from any deed or oral contract. The duration of the partnership may be limited by the contract or agreement, or it may be left indefinite, subject to be dissolved by mutual consent. The members of a partnership are called *nominal* when they have not any actual interest in the trade or business, or its profits, but, by allowing their names to be used, hold themselves out to the world as apparently having an interest; *dormant* or *sleeping*, when they are merely passive in the firm, in contradistinction to those who are active and conduct the business as principals, and who are known as *ostensible* partners. A partnership may be limited to a particular transaction or branch of business, without comprehend-

ing all the adventures in which any one partner may embark, but such reservation must be specified in the deed of contract. For in the usual course each member of a partnership is liable at common law for the debts of the firm, and a sleeping partner is responsible for all debts of the firm which have been contracted during his partnership. The powers of partners are very extensive, and the contract or other act of any member or members of the associated body in matters relating to the joint concern is, in point of law, the contract or act of the whole, and consequently binding upon the whole, to the extent of rendering each liable for it individually as well as in respect of the partnership property. This power does not extend to matters extraneous to the joint concern. Partners, though they should act in a fraudulent manner as respects their copartners, bind the firm in all matters connected with its peculiar dealings.

Parton (par'tun), JAMES, biographer, born at Canterbury, England, in 1822; died in 1891. He became a resident of New York and for a time was editor of the *Home Journal*. He wrote numerous able and popular works of biography. Among them were *Life of Thomas Jefferson*, *Life and Times of Benjamin Franklin*, *Life of Voltaire*, *Captains of Industry*, *Famous Americans*, etc.

Partridge (pär'trij), a well-known rasorial bird of the grouse family (Tetraonidæ). The common partridge (*Perdix cinereus*) is the most plentiful of all game-birds in Britain, and occurs in nearly all parts of Europe, in

Red-legged Partridge (*Perdix rufus*)

North Africa, and in some parts of Western Asia. The wings and tail are short, the tarsi as well as the toes naked, and the tarsi not spurred. The greater part of the plumage is ash-gray finely varied with brown and black. They feed on grain and other seeds, insects and their larvæ and pupæ, and are chiefly found in cultivated grounds. Besides this species there are the red-legged, French, or Guernsey partridge (*P.* or *Caccabis rufus*), which may now be found in considerable numbers in different parts of England; the Greek partridge (*P. saxatilis*), the African partridge, the Arabian partridge, the Indian partridge. The name partridge is applied in the United States to several North American species of the genus *Ortyx* or quails.

Partridge Berry, a plant of the heath family, the *Gaultheria procumbens*, inhabiting North America, also known as wintergreen. The name is also applied to another North American shrub, *Mitchella repens*, a pretty little trailing plant, with white fragrant flowers and scarlet berries, nat. order Rubiaceæ.

Partridge Pigeon, a name for some of the Australian pigeons, otherwise called bronze-wings (which see).

Partridge Wood, a very pretty hardwood obtained from the West Indies and Brazil, and much esteemed for cabinet-work. It is generally of a reddish color, in various shades from light to dark, the shades being mingled in thin streaks. It is said to be yielded by a leguminous tree, *Andira inermis*, and other South American and West Indian trees.

Parts of Speech are the classes into which words are divided in virtue of the special functions which they discharge in the sentence. Properly speaking, there are only seven such classes, namely the noun, adjective, pronoun, verb, adverb, preposition and conjunction; for the article, which is usually classed as a separate part of speech, is essentially an adjective, while the interjection can hardly be said to belong to articulate speech at all. Each of the parts of speech will be found separately treated under their several heads throughout the work.

Party-wall is the wall that separates two houses from one another. Such a wall, together with the land upon which it stands, belongs equally to the landlords of the two tenements, half belonging to the one and half to the other.

Parvis (pär'vis), PARVISE, the name given in the middle ages to the vacant space before a church, now applied to the area around it.

Pasadena (pas-a-dē'na), a city and all-year-round resort of Los Angeles Co., California, 9 miles N. E. of Los Angeles, near the base of the Sierra Madre Mountains, in a famous fruit region. It has a college of technology,

library and many fine hotels. Pop. (1910) 30,291; (1920) 45,354.

Pascagoula (pas-ka-gō'la), county seat of Jackson Co., Mississippi, on Pascagoula River. Has ship yards, saw mills, etc. Pop. 6082.

Pascal (pas'kal), BLAISE, a French philosopher and mathematician, born at Clermont, in Auvergne in 1623; died in 1662. In early youth he showed a decided inclination for geometry, and so rapid was his advance that while yet in his sixteenth year he wrote a treatise on conic sections, which received the astonished commendation of Descartes. His studies in languages, logic, physics, and philosophy were pursued with such assiduity that his health was irrecoverably gone in his eighteenth year. In 1647 he invented a calculating machine, and about the same time he made several discoveries concerning the equilibrium of fluids, the weight of the atmosphere, etc. He now came under the influence of the Jansenists —Arnauld and others—and from 1654 he lived much at the monastery of Port Royal, and partly accepted its rigorous rule, though he never actually became a solitaire. He afterwards retired to a country estate, and finally returned to Paris, where he closed a life of almost unbroken ill-health. About 1655 he wrote, in defense of his Jansenist friend Arnauld, his famous 'Provincial Letters' (*Lettres Écrites par Louis de Montalte à un Provincial de ses Amis*), and after his death his *Pensées* or *Thoughts* were published as the fragments of an unfinished apology for Christianity. The latter, however, for long appeared in a garbled and corrupt form, and it is only lately that anything like a pure text has appeared. Of the *Lettres* there are many trustworthy editions.

Pasco. See *Cerro de Pasco.*

Pas-de-Calais (pä-dē-kà-lā), a maritime department of Northern France; area, 2606 square miles. Its coast, extending about 80 miles, presents a long tract of low sandhills, but near Boulogne forms a lofty crumbling cliff. The interior is generally flat, the streams and canals are numerous, and the soil fertile and well cultivated. The principal harbors are Boulogne and Calais. The chief minerals are indifferent coal, good pipe and potter's clay, and excellent sandstone. There are numerous iron-foundries, glassworks, potteries, tanneries, bleachworks, mills, and factories of all kinds. The capital is Arras. Pop. 1,068,155.

Pasewalk (pä'zē-vålk), a town of Pomerania, Prussia, 22 miles W. N. W. of Stettin, situated on the Ucker. Its industries embrace iron-founding, starch, tobacco, etc. Pop. 10,916.

Pasha (pa-shą', pä'shà), in Turkey, an honorary title originally bestowed on princes of the blood, but now conferred upon military commanders of high rank and the governors of provinces. There are three grades, each distinguished by a number of horse-tails waving from a lance, the distinctive badge of a pasha. Three horse-tails are allotted to the highest dignitaries; the pashas of two tails are generally the governors of the more important provinces; and the lowest rank, of one tail, is filled by minor provincial governors. Spelled also *Pacha* (the French spelling).

Pasig (pä'sēg), a town of Luzon, Philippine Islands, capital of the province of Rizal, 8 miles E. of Manila, on Laguna Bay. Pop. 11,287—a river, 1½ miles long, connecting Manila Bay with Laguna Bay.

Pasque Flower (pask), the name given to *Anemone Pulsatilla*, nat. order Ranunculaceæ, a plant with purplish flowers found on the continent of Europe, and so named because its petals are frequently used to dye Easter or *pasque eggs*. The flower blossoms in spring, and its leaves, when crushed, emit an acrid, poisonous juice.

Pasquinade (pas'kwi-nād), a lampoon or short satirical publication, deriving its name from *Pasquino*, a tailor (others say a cobbler, and others again a barber) who lived about the end of the 15th century in Rome, and who was much noted for his caustic wit and satire. Soon after his death satirical placards were attached to a mutilated statue which had been dug up opposite his shop. His name was transferred to the statue and the term *pasquil* or *pasquinade* applied to the placards in which the wags of Rome lampooned well-known personages.

Passaic (pas-sā'ik), a city of Passaic county, New Jersey, on the Passaic River, and the main line of the Erie, N. Y., Susquehanna & Western, and Delaware, Lackawanna & Western railroads, 12 miles W. of New York. Has large manufactures of wool, textiles, and handkerchiefs; also extensive print and chemical works, rubber manufacturing, metal, leather, silk, and other industrial establishments. Pop. (1910) 54,773; (1920) 63,824.

Passamaquoddy Bay (pas-sà-mà-kwod'di), a bay opening out of the Bay of Fundy, and lying between the State of Maine

and the Canadian province of New Brunswick. It is about 13 miles long and 6 miles wide, and is dotted with islands which make a safe harbor for the thriving town of Eastport.

Passant (pas'ant), in heraldry, a term applied to a lion or other animal in a shield appearing to walk leisurely, looking straight before him, so that he is seen in profile; when the full face is shown the term *passant gardant* is employed; and when the head is turned fairly around, as if the animal were looking behind, it is *passant regardant*.

Passau (pâs'sou), a town of Bavaria, picturesquely situated on a rocky tongue of land formed by the confluence of the Inn and Danube, 91 miles E. N. E. of Munich, on the southeast frontier of the kingdom. The principal buildings are the cathedral, an important example of 17th century work; the bishop's palace; Church of St. Michael; Jesuit College, now a lyceum; the town-house, gymnasium, library, etc. There is an important trade in timber. The fortress of Oberhaus crowns a precipitous wooded height (426 feet) on the left bank of the Danube opposite Passau. Pop. 18,003.

Passengers (pas'en-jėrz). Railway, and other public carriers are legally required to carry passengers without any negligence on their (the carriers') part. In case of accident the carrier is obliged to show that it was from no fault or negligence on his part, or on the part of his servants, that the accident occurred. Hence all passengers injured (or in case of death their nearest relatives) have a claim for compensation, unless it can be proved that the accident was due to the fault of the passenger. Passengers by sea are carried subject to the same general law as those by land; the carriers are bound to observe all due precautions to prevent accident or delay. No passenger ship having fifty persons on board, and the computed voyage exceeding eighty days by sailing vessels or forty-five by steamers, can proceed on its voyage without a duly qualified medical practitioner on board. In the case of imminent danger from tempest or enemies passengers may be called upon by the master or commander of the ship to lend their assistance for the general safety.

Passeres (pas'e-rēz), the name given by Linnæus and Cuvier to the extensive order of birds also called Insessores or perchers. See *Insessores*, *Ornithology*.

Passing-bell, the bell that was rung in former times at the hour of a person's death, from the belief that devils lay in wait to afflict the soul the moment when it escaped from the body, and that bells had the power to terrify evil spirits. In the proper sense of the term it has now ceased to be heard, but the tolling of bells at deaths or funerals is still a usage, more particularly as a mark of respect.

Passion (pash'un), THE, a name for the crucifixion of Jesus and its attendant sufferings.

Passion-flower (*Passiflōra*), a large genus of twining plants belonging to the nat. order Passifloraceæ. They are all twining plants, often climbing over trees to a considerable length, and in many cases are most beautiful objects, on account of their large, rich, or gaily-colored flowers, which are often succeeded by orange-colored edible fruits, for which indeed they are chiefly valued in the countries where they grow wild. *Passiflora laurifolia* produces the water-lemon of the West Indies, and *P. maliformis* bears the sweet calabash. The name is applied more especially to *P. cærulĕa*, which is commonly cultivated in England out of doors, and is the one to which the genus owes its name.

Passionists (pash'un-istz), a religious order in the Church of Rome, founded in 1737. The members practice many austerities; they go barefooted, rise at midnight to recite the canonical hours, etc. It is also known as the Order of the Holy Cross and the Passion of Christ.

Passion Play, a mystery or miracle play representing the different scenes in the passion of Christ. The passion play is still extant in the periodic representations at Oberammergau (which see).

Passion Week. See *Holy Week*.

Passive (pas'iv), in grammar, a term applied to certain verbal forms or inflections expressive of suffering or being affected by some action, or expressing that the nominative is the object of some action or feeling; as, she *is loved* and *admired*.

Passometer (pas-om'e-tėr), a small machine, with a dial and index-hands like a watch, carried by pedestrians to record their steps in walking; a sort of hodometer. Also known as Pedometer.

Passover (pas'ō-ver), a feast of the Jews, instituted to commemorate the providential escape of the Hebrews in Egypt, when God, smiting the first-born of the Egyptians, *passed over* the houses of the Israelites, which

were marked with the blood of the paschal lamb. It was celebrated on the first full moon of the spring, from the 14th to the 21st of the month Nisan, which was the first month of the sacred year. During the eight days of the feast the Israelites were permitted to eat only unleavened bread, hence the passover was also called the 'feast of unleavened bread.' Every householder with his family ate on the first evening a lamb killed by the priest, which was served up without breaking the bones. The passover was the principal Jewish festival.

Passport (pas'pōrt), a warrant of protection and authority to travel, granted to persons moving from place to place, by a competent authority. In some states no foreigner is allowed to travel without a passport from his government, and in all cases the visitor to the continent of Europe is wiser to provide himself with one, if only as a means of identification. In Russia and Turkey, in particular, a passport is indispensable. Passports to British subjects are granted at the Foreign Office, London. In the United States passports, with description of the applicant, are issued by the State Department at Washington. They are good for two years from date, renewable by stating the date and number of the old one. The fee required is one dollar. They are issued only to citizens, native-born or naturalized.

Pasta (pàs'tà), GIUDITTA, an operatic singer, born at Como, near Milan, in 1798, of Jewish parents; died in 1865. She appeared at first without success, but in 1819–22 her reputation steadily increased, and up till 1833 she held one of the foremost places on the lyric stage, which she then quitted. She was specially distinguished in the tragic opera: Bellini wrote for her his *Norma* and *Sonnambula*, and she made the rôles of *Medea*, *Desdemona*, and *Semiramide* her own.

Paste (pāst), a composition in which there is just sufficient moisture to soften without liquefying the mass, as the paste made of flour used in cookery. The term is applied to a highly refractive variety of glass, a composition of pounded rock-crystal melted with alkaline salts, and colored with metallic oxides: used for making imitation gems. One variety of it is called *Strass*.

Pastel (pas'tel), or PASTIL, a colored crayon. *Pastel painting.* See *Crayon.*

Pastern (pas'tèrn), the part of a horse's leg between the joint next the foot and the coronet of the hoof: it answers to the first phalanx of a man's finger.

Pasteur (pâs-teur), LOUIS, a French chemist and physicist, born at Dôle, Jura, in 1822; educated at Jena University and the École Normale, Paris, where in 1847 he took his degree as doctor. The following year he was appointed professor of physics in Strasburg, where he devoted much research to the subject of fermentation; in 1857 he received the appointment of dean in the Faculty of Sciences, Lille; in 1863 he became professor of geology, chemistry, and physics at the Ecole des Beaux-Arts, Paris; and in 1867 professor of chemistry at the Sorbonne. He became a member of the French Academy in 1882. He won a world-wide reputation by his success in demonstrating the agency of microbes in fermentation and decomposition, in introducing a successful treatment of disease in silkworms and cattle, and in his efforts to check hydrophobia by means of inoculation. To enable him to deal with this disease under the best conditions a *Pasteur Institute* was opened in Paris, where patients were received from all parts of Europe, and thousands of persons suffering from hydrophobia were cured of the terrible disease. Similar institutions have been opened elsewhere. He died in 1895. See *Hydrophobia.*

Pasteurizer (pas'ter-iz'er), an apparatus for preserving milk and other fluids from deterioration, named from Louis Pasteur (q. v.) the famous French chemist. To kill the bacteria a degree of heat varying from 130 to 160 Fahrenheit is employed. The pasteurization of milk has grown in favor, and the Dairy Division of the United States Department of Agriculture announces that it has been proven to be less expensive than is generally believed. According to the figures of the department a careful study of a number of milk plants showed the average cost to be 0.315 cent for a gallon of milk and 0.034 for a gallon of cream. Laboratory tests have indicated that milk can be bottled hot and thus prevent reinfection while handling The pasteurization of milk at low temperatures is said to hasten the rising of cream.

Pasticcio (pàs-tish'i-ō), in music, an opera, cantata, or other work, the separate numbers of which are gleaned from the compositions of various authors, or from several disconnected works of one author. In art the term is applied to a work which, though original in subject, is in treatment and execution in the direct manner of another artist.

Pastille (pas'til, pastēl'), or PASTIL, a mixture of odorous gum-resin made up into small cones and burned in an apartment to give it a pleasant perfume. Pastilles are also made into pills, and used by smokers to give the breath an aromatic odor.

Pasto (päs'tō), a town of the republic of Colombia, dep. Cauca, founded in 1539. It has manufactures of blankets, hats, pottery, etc. Pop. 6000.

Paston Letters, THE, a collection of letters written by and to members of the Paston family in Norfolk during the period of the wars of the Roses, four volumes of which were published by Mr. (afterwards Sir) John Fenn, and a fifth by his literary executor, Sergeant Frere (London, 1787-89 and 1823). These letters deal freely with the domestic affairs, the interests in public movements, the intriguing at elections, and the lawsuits of this particular family, and all the relations of English popular life in the period in which they were written. An accurate and extended edition in 3 vols. by Mr. Gairdner has been published (1872-75).

Pastor (pas'tur), a genus of birds belonging to the starling family, found in the north of Africa, Syria, and India. The rose-colored pastor (*P. roseus*) is a favorite song bird.

Pastor, the regularly ordained preacher of a congregation of religious worshipers.

Pastoral Letters (pas'tur-al) are circulars addressed by a bishop to the clergy or laity under his jurisdiction at certain stated times or on special occasions for purposes of instruction or admonition.

Pastoral Poetry, poetry which deals, in a more or less direct form, with rustic life. It has generally flourished in highly-corrupted artificial states of society. Thus it was that Theocritus, the first pastoral poet, made artistic protest against the licentiousness of Syracuse; and Virgil wrote his *Bucolics* and *Eclogues* in the corrupt Roman court. In the 16th century pastoral poetry received its most notable expression in the *Arcadia* of G. Sannazaro, the *Aminta* of Tasso, and the *Pastor Fido* of Guarini. This tendency, which was so potent in Italy, spread to England, and influenced the *Shepherd's Calendar* of Spenser, the *Arcadia* of Sidney, the *Faithful Shepherdess* of Fletcher, *As You Like It* of Shakespeare, and the *Comus* of Milton. The *Gentle Shepherd* of Allan Ramsey (1725) was the last successful dramatic pastoral.

Pastoral Ring, a ring worn by bishops on the ring-finger of the right hand.

Pastoral Staff, the official staff of a bishop or abbot. It is of metal, or of wood ornamented with metal, and has the head curved in the form of a shepherd's crook as a symbol of the pastoral office. See *Crosier*.

Pastoral Theology, that part of theology which treats of the obligations of the pastors themselves, and which is therefore designed for the training and preparation of the candidates for the pastoral office.

Pastry (pās'tri), articles of food made of paste or dough, which has been worked up with butter or fat, so that it assumes a light, flaky appearance. There are several varieties, such as puff-paste, paste for raised pies, and a light spongy kind called *brioche*. Pastry as a rule is somewhat indigestible.

Pasture (pas'tūr), land under grass and herbage, which is eaten as it grows by horses, oxen, sheep, and other herbivorous animals. First-class pastures are used for feeding heavy oxen; second class for inferior or dairy cattle; while hillsides, moors, and uplands are utilized for sheep. The great plains of the Western United States have long been devoted to pasture, feeding vast multitudes of grazing animals, and the same is the case with the great grassy areas of South America, New Zealand, and Australia. See *Common*.

Patagium (pa-ta-ji'um) is the name applied to the expansion of the skin or integumentary membrane by means of which bats, flying squirrels, flying lizards, and other semi-aerial forms support themselves in the air. This membrane is not a true wing, but is used as a kind of parachute for temporary support.

Patagonia (pa-ta-gō'ni-a), the name usually applied to that southern portion of South America which is bounded E. by the Atlantic, W. by the Pacific, S. by the Straits of Magellan, and N. by the Rio Negro. Since 1881 this large territory has been, by treaty, divided between Chile and the Argentine Republic, so that the portion west of the Andes (63,000 square miles) belongs now to the former, and the portion east of the Andes (360,000) belongs to the latter. The Straits of Magellan form a southern boundary of 360 miles, and separate the mainland from the numerous islands of Tierra del Fuego. Here the Chilean government has established the settlement of Punta Arenas, with stations along the

coast. Patagonia east of the Andes consists mainly of vast undulating plains, frequently covered with shingle and broken up by ridges of volcanic rock. The vegetation is scanty, except in the region adjoining the Andes, and in many places there are shallow salt lakes and lagoons. The chief rivers are the Rio Negro, the Chupat, the Rio Desire, and the Rio Chico, all of which have their sources in the Andes, and run eastward. There are few if any good seaports. The Patagonians are a tall, muscular race averaging fully 6 feet in height, with black hair, thick lips, and skin of a dark-brown color. They are a nomad race, divided into numerous tribes, whose chief occupation is in hunting and cattle-breeding. This native population, however, never numerous, is rapidly disappearing. Colonization is encouraged by the Argentine government, and there are many tracts suitable for European settlement. The country was first discovered by Magellan in 1520.

Patamar (pa-ta-mär'), a vessel employed in the coasting trade of Bombay and Ceylon. Its keel has an upward curve amidships, and extends only about half the length of the vessel; the stem and stern, especially the former, have great rake; and the draught of water is much greater at the head than at the stern. These vessels sail remarkably well, and stow a good cargo.

Patan. See *Lalitapatan.*

Patchouli (pa-chö'li), a perfume obtained from the dried leaves and branches of the *Pogostēmon patchouli*, a labiate plant of India and China, where it is cultivated on a large scale. It is used in India to scent costly Cashmere shawls, tobacco, and hair-oil, and is everywhere valued as a preservative of woolens and linens from insects.

Pâté de foie gras (pä-tā dė fwâ grä), a dish made from the enlarged livers of overfed geese, and much relished by epicures. It is made in the form of a pie, and from its oily nature is very indigestible.

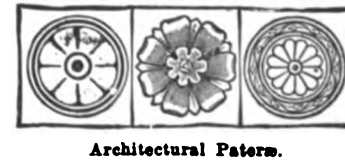
Patella (pa-tel'a), the name applied in anatomy to the 'knee-cap' or 'knee-pan,' the sesamoid bone of the knee.— The name is also applied to a genus of gasteropodous molluscs comprising the limpets.

Paten (pat'en), an ecclesiastical term applied to the round metallic plate on which the bread is placed in the sacrament of the Lord's supper. It often serves as a cover for the chalice.

Patent (pat'ent, pā'tent), a privilege from government granted by letters patent (whence the name), conveying to the individual or individuals specified therein the sole right to make, use, or dispose of some new invention or discovery for a certain limited period. The patent laws vary considerably in different countries. In the United States under the act of 1870 a patent is granted for a period of seventeen years to the original inventor only; in France it is granted to the patentee for a term of fifteen years on payment of $20 annually; in Germany the period is fifteen years with a first payment of $7.50; in Great Britain it is granted for fourteen years, but the period may be extended if the inventor can prove that his invention, while useful, has been of little benefit to him. The various colonies and dependencies of Great Britain have each a separate patent law. An international convention for the protection of patentees has been formed whereby equal rights are secured in all the signatory countries. The Patent Office of the United States is a bureau of vast extent, its extensive museum of 300,000 models, located in a fine marble building, being one of the sights of the capital. It employs a large number of examiners and clerks, and issues more than 30,000 patents annually. It issues monthly volumes in quarto, with detailed descriptions and drawings of patents, and a weekly *Official Gazette* of the Patent Office, with reduced drawings and lists of new patents.

Within forty years (1871–1910) the United States issued over 800,000 patents, while the total number, since the formation of the government, crossed the 1,000,000 mark in 1911. This much surpasses the issue of other countries, the patents issued by Great Britain and France being about 400,000 for each country; Germany, 225,000; Belgium, 200,000; Canada, 120,000, and other nations in diminishing numbers.

Patera (pat'e-ra), a shallow, circular, saucer-like vessel used by the Greeks and Romans in their sacrifices and libations. The name is applied in architecture to the representation of a flat round dish in bas-relief, used as an ornament in friezes, etc.



Architectural Paterae.

Paterculus (pa-tėr'ku-lus), CAIUS VELLEIUS, an ancient Roman historian, born about 19 B. C.; died about 31 A. D.

Paternians (pa-tėr'ni-anz), a heretical sect of the 5th century, followers of *Paternus*, who are said to have held that God made the nobler parts of man and Satan the lower. Hence they served God with the former parts and the devil with the latter.

Paterno (pä-tėr'nō), an ancient town of Sicily, 10 miles northwest of Catania, at the foot of Mt. Etna. In the vicinity are mineral springs and the remains of baths, an aqueduct, etc. Pop. 29,000.

Paternoster (pā'tėr-nos-tėr; Latin, 'Our Father'), the opening words of the Latin version of the Lord's prayer, hence employed to designate the prayer itself. See *Lord's Prayer*.

Paterson (pat'er-sun), a city, county seat of Passaic Co., New Jersey, on both sides of the Passaic River; the celebrated Falls of the Passaic being within the city limits, 17 miles from New York. The city was founded in 1791 by Alexander Hamilton as one of the first industrial communities of the country. Abundant water power is furnished by the Falls. Paterson is the silk center of the country; the silk mills and silk dyeing establishments giving employment to about 30,000. Over $200,000,000 worth of silk is turned out annually in the city. Other important industries are locomotive and bridge works, motor manufacturing plants and textile machinery and other machinery manufacturing plants. There are large shirt factories, thread and other plants. Pop. (1900) 105,171; (1910) 125,600; (1920) 135,866.

Paterson, WILLIAM (1745-1806), an American statesman and jurist, born at sea, of Irish parents. He graduated at Princeton (then College of New Jersey) in 1763, after which he studied law and was admitted to the bar. As a delegate from New Jersey to the convention of 1787 which framed the constitution of the United States he led those who were opposed to a strong central government, and proposed instead the 'New Jersey plan,' which provided for a single legislative body in which each State should have one vote. In 1789 he was a member of the senate from New Jersey, and from 1791 to 1793 was governor of the State. In 1793 Washington appointed him a justice of the United States Supreme Court, a position which he continued to hold until his death. The town of Paterson, New Jersey, was named in his honor.

Paterson, WILLIAM (1839-1914), a Canadian statesman, born at Hamilton, Ontario. He was controller of customs in the Laurier administration, 1896; privy councillor and minister of customs, 1897-1911.

Paterson, WILLIAM, financier and founder of the Bank of England, was born in Dumfriesshire in 1665; died in London in 1719. He went through England as a peddler, settled for a time at Bristol, subsequently resided in the Bahama Islands. Returning to London, he engaged in trade with success, and in 1694 proposed and founded the Bank of England, being one of its first directors. Before this time he had conceived the project of founding a free emporium of trade in Darien, and in 1695 he obtained the sanction of a Scottish act of parliament constituting the Darien Company. (See *Darien Scheme.*) After the failure of this great scheme he returned to England broken in health and fortune. When the Treaty of Union between England and Scotland was concluded in 1707, Paterson, who was one of its warmest advocates, after much difficulty received an indemnity of £18,000 for the losses he had sustained. Paterson was a great financial genius, but most of his views (such as his advocacy of free-trade) were far in advance of his time.

Pathognomonic (path-o-no-mon'ik) signs or symptoms, are signs and symptoms which are specially characteristic of a given disease, and the mere presence of which is sufficient to make a diagnosis of that disease.

Pathology (pa-thol'o-je) is that branch of science which treats of disease. It is concerned with any deviation from health or any variation from the normal. Since there is no clear-cut dividing line between health and disease, the boundaries of pathology cannot be definitely fixed. Pathology includes a study of the causes, symptoms, disturbances in structure and function, and results of disease. The term is often extended to include classification of diseases, questions bearing on heredity, immunity, and bacteriology in general. It will thus be seen that the subject of pathology is almost coextensive with the study of medicine.

Pathological disorders are often divided into two main groups: (1) *Progressive* changes, in which there is an increase in the vital activities of the cells, or tissues, or of the body; and (2) *Retrogressive* changes, in which there is a decrease in the vital activities of the cells, or tissues, or of the body. These conditions do not imply a mere excess or defect, but include

also definite changes, both structural and functional The chief progressive changes are repair of tissues, inflammation, hypertrophy, and tumors; the chief retrogressive processes are atrophy, the degenerations and infiltrations, and necrosis. It is also customary to divide the subject of Pathology into *General Pathology*, which treats of disease processes irrespective of the particular tissues involved; and *Special Pathology*, which treats of disease conditions in particular organs, or of particular diseases. Pathology is also subdivided into *Gross Pathology*, which treats of the naked-eye appearance of diseased tissues and organs, and includees the technique of postmortem examinations; and *Histo-pathology*, which includes the use of the microscope in the study of the diseased parts.

The various causes of diseases are viewed as (1) Predisposing, and (2) Exciting or Determining. The predisposing factors include such questions as heredity, age, sex, race, etc. The main exciting causes of disease are injury, variations in temperature, poisons and corrosives, electricity and X-ray, bacteria and parasites; in addition to these, such conditions as faulty metabolism and harmful chemical changes taking place in the body may give rise to autointoxication. Various industrial conditions, evoked by present-day problems, are also potent factors in the causation of disease. Overcrowding, with foul air, bacteria, parasites, and diseases such as tuberculosis, skin lesions, gonorrhea and syphilis, will occur to most readers in this connection.

Another pathological class, to which attention should be drawn, is that due to errors or defects of development. Extreme cases are known as monsters, or teratomata; lesser forms are excess or defect in number of fingers or toes, etc.; various forms of hermaphroditism or pseudo-hermaphroditism; hare-lip, cleft palate, etc.

There is hardly a chapter in physiology, or a phase of any normal function, which may not have a corresponding chapter in pathology. Thus, just as we may have the physiology of digestion, or circulation or vision, so we may have the pathology of each of these (and other) functions. Thus it will be seen that the field of pathology is enormous, that it is inextricably woven into almost every other branch of medical science, and that a recognition of the place of pathology in the modern scheme of medical education is perhaps the main factor in the latter day advances in medical science.

The results of disease are various. In some cases there may be a complete restoration to health, or recovery; in other cases, the patient may suffer from other diseased conditions, due directly or indirectly to the former malady; these are called secondary diseases or *sequelæ*. In yet other cases, death may ensue as a result of the disease; sometimes the sequelæ, just alluded to, have a fatal termination.

The term pathology is sometimes used with a wider meaning, and is made to include *Plant pathology* and *Animal pathology;* and the latter term then includes *Human pathology* and the pathology of the animals. But plant pathology is now generally called *Phytopathology*, and (unless specially stated) pathology means human pathology.

Patiala (pat-ē-ä'lâ), an Indian native state in the jurisdiction of the Punjab government, the larger part of which is situated south of the Sutlej and the other part in the hill country near Simla; area, 5412 square miles. Besides the usual agricultural products, the state has slate, lead, marble, and copper mines. The Mahárája of Patiala has been of service to the British government on several critical occasions, such as the mutiny of 1857, and for this loyalty he has been rewarded by an increase of territory. Pop. of the state, 1,596,692. The capital is Patiala, 130 miles S. E. of Amritsir. It was founded in 1752 by Sardar Ala Singh. Pop. 46,974.

Patina (pa-tē'na, pat'i-na), in the fine arts, the fine green rust (an alkaline carbonate of copper) with which ancient bronzes and copper coins and medals become covered by lying in particular soils. This, like varnish, is at once preservative and ornamental. An artificial patina is produced by the forgers of antiquities by acting on them with acetic acid, but it is not durable.

Patmore (pat'mōr), Coventry Kearsey Deighton, an English poet, born in 1823. He published his first volume of poems in 1844, became assistant librarian at the British Museum, and associated himself with the pre-Raphaelite movement. His reputation as a poet was established by the publication of the four parts of *The Angel in the House* (1854-63), which he revised in successive editions. Besides this work he published *The Unknown Eros and other Odes*, a poetical anthology called the *Children's Garland*, a *Memoir of B. W. Proctor*, and several contributions to periodicals. He died in 1896.

Patmos (pat'mos), an island of Turkey in Asia, in the Grecian Archipelago, about 26 miles S. S. W. of Samos; greatest length, 12 miles; breadth,

nearly 6. The island is an irregular mass of barren rock, agricultural products are scanty, and the population (mostly Greeks) find their chief occupation in fishing. Near the excellent natural harbor of La Scala is the small town of Patmos, overlooked by the old monastery of St. John, in a grotto of which, it is said, the Apostle John saw his apocalyptic visions. Pop. about 4000.

Patna (pat'na), a city, capital of the province of Behar and Orissa, British India, on the Ganges, near its junction with the Son and the Gandak, and about 400 miles northwest from Calcutta. It extends for 9 miles along the river, from which its tombs, mosques, and monuments present a fine appearance. On the west side is the suburb of Bankipur, where the government offices and European residences are situated. By reason of its central position and natural advantages the city is an important business mart, and the chief seat of the opium trade. Pop. 134,785.—The district of PATNA has an area of 2079 square miles, for the most flat and exceedingly fertile. The staple crop is rice, and the other products are wheat, barley, cotton, tobacco, and sugar-cane. Pop. 1,624,985.

Patna, a native state in the Central Provinces of India. The country is hilly, and its large forests are infested by tigers, leopards, etc., while about a fourth of its area of 2400 square miles is cultivated. It is now under direct British supervision. Pop. 277,748.

Patois (pâ-twä), a French word of unknown origin used to denote a dialect spoken by the rustic, provincial, or uneducated classes.

Paton (pat'on), JOHN GIBSON, missionary to the New Hebrides (1824-1907), born at Kirkmahoe, near Dumfries, Scotland, educated at Dumfries Academy, Normal Seminary and Glasgow University. He was a city missionary in Glasgow for ten years, and after being ordained to the ministry, sailed for the New Hebrides in 1858. His struggles to propagate the Gospel among the cannibals are graphically told in his *Autobiography*. In 1892 he visited the United States.

Paton, SIR JOSEPH NOEL, a Scottish painter (1821-1901), born at Dunfermline. Among his paintings are *Ruth Gleaning, Spirit of Religion, Oberon and Titania, Luther at Erfurt*, etc.

Patras (pä'trâs), a fortified seaport and important trading town of Greece, in the northwest of the Morea, on the east side of the gulf of same name. The public buildings include several churches, hospitals, and a celebrated castle of great strength, also remains of a Roman aqueduct. There is an important trade in currants. Pop. 37,401 —The Gulf of Patras lies between the northwest part of the Morea and Northern Greece, and communicates on the east with the Gulf of Lepanto.

Patriarch (pā'tri-ark; from the Greek *patria*, tribe, and *archein*, to rule), the antediluvian head of a family; especially, originally applied to the three ancestors of the Hebrew race, Abraham, Isaac, and Jacob. The term at a later period became the title of the presidents of the sanhedrim, which exercised a general authority over the Jews of Syria and Persia after the destruction of Jerusalem. From them the title was adopted by the Christians, who applied it, from the beginning of the 5th century, to the bishops of Rome, Constantinople, Alexandria, Antioch, and Jerusalem. The Patriarch of Rome became the supreme pontiff of the West (see *Popes*), the four heads of the Eastern church preserving the title of patriarch. The Patriarch of Constantinople is the primate of the Greek Church in the Ottoman Empire, and bears the title of *œcumenical*.

Patrician (pa-trish'an; Latin, *patricius*, from *pater*, father), the name given by the Romans to the members and descendants by blood or adoption of the original *gentes*, houses or clans who, after the plebeians became a distinct order, constituted the aristocracy of the city and territory. See *Rome*.

Patrick (pat'rik; PATRICIUS), ST., the apostle of Ireland, was born about 373 in the British Roman province of Valentia, probably at Nemthur on the Clyde where Dumbarton now is. His father, a decurion in the Roman army, retired to a farm on the Solway, whence, at the age of sixteen, Patrick was carried off by a band of marauders and sold as a slave to the Irish Celts of county Antrim. After six years he made his escape, and, resolving to devote himself to the conversion of Ireland, prepared himself for the priesthood, probably at the monastic institution founded by St. Ninian at Candida Casa (Whithorn) in Galloway. Having been ordained a bishop and received the papal benediction from Celestine I, he went over to Ireland about the year 405. Here he is said to have founded over 360 churches, baptized with his own hand more than 12,000 persons, and ordained a great number of priests. The date of his death is probably 463; it occurred at a place called Saul, near Down-

patrick, and his relics were preserved at Downpatrick till the time of the Reformation. His authentic literary remains consist of his *Confessions* and a letter addressed to a Welsh chief named Corotic. The existence of two other Irish apostles, Patrick or Palladius, and Senn (old) Patrick, about the same time has caused much confusion in the history of the early Irish church.

Patrick, ST., ORDER OF, an Irish order of knighthood, instituted in 1783 by George III, originally consisting of the sovereign, the lord-lieutenant of Ireland for the time being (who is the grandmaster of the order), and fifteen knights; but by a statute in 1833 the order was enlarged and the number of knights raised to twenty-two. The badge of the order is of gold, oval in shape, with the cross of St. Patrick surmounted by a shamrock in the center, and round this is a blue enameled band bearing the motto 'Quis separabit.' The badge is suspended to a collar of roses and harps by means of an imperial crown and gold harp. The mantle and hood are of sky-blue tabinet, lined with white silk.

Patristic Theology (pa-tris'tik), that branch of historical theology which is particularly devoted to the lives and doctrines of the fathers of the church.

Patroclus (pa-trō'klus), in Greek story, the friend of Achilles, whom he accompanied to the Trojan war. His success was at first brilliant; but, Apollo having stunned him and rendered him defenseless, he was slain by Euphorbus and Hector. See *Achilles.*

Patrol (pa-trōl'), a walking or marching round by a guard in the night to watch and observe what passes, and to secure the peace and safety of a garrison, town, camp, or other place; also, the guard or persons who go the rounds for observation.

Patron (pā'trun), in the Roman republic, a patrician who had plebeians, called *clients*, under his immediate protection, and whose interests he supported by his authority and influence. In later times the term patron was applied to every protector or influential promoter of the interests of others; hence the saints who were believed to watch over the interests of particular persons, places, or trades were called *patron saints.* See next article.

Patronage (pā'trun-ij, pat'run-ij), ECCLESIASTICAL, the right of presenting a fit person to a vacant benefice. In the earlier ages the bishops appointed the holders of all benefices, but subsequently when proprietors of lands began to erect and endow churches they obtained the privilege of nominating the clergyman. For a considerable time not only the nomination but also the investiture of the clergy were in the hands of laymen; but the hierarchy began to consider this an infringement of its prerogatives, and several successive popes and councils declared that the investiture was not valid unless it had also received the sanction of the ecclesiastical authority. Ecclesiastical patronage thus came to reside mainly in the pope, and the principal benefices in Europe were filled by Italian ecclesiastics, who were often ignorant of the language of their flocks. In England this led to the Statutes of Provisors (1350–1415), by which persons who should attempt to enforce such appointments were subjected to severe penalties. In England the sovereign is the patron paramount of all benefices which do not belong to other patrons; but a vast number of livings are in the gift of private persons, who possess the *advowson* as attached to their property. See *Advowson.*

Patroons, the name given to the lords of the manor in early colonial days in America. The act of 1629 provided that directors and shareholders in the Dutch West India Co. (q. v.) might take up certain sections of land in New Netherland provided they settled a number of tenants thereon. These estates were known as manors and their proprietors as patroons. The tenants were bound for a period usually of ten years and were little better than slaves, with the patroons petty sovereigns within their domains. The evils of the patroon system culminated in the Anti-Rent War (q. v.), which put an end to feudal tenures. The largest manor, and the most successful, was that of Kilaen Van Rensselaer in Albany and Rensselaer counties.

Patten (pat'en), SIMON NELSON, economist, born at Sandwich, Illinois, in 1852, became professor of political economy at the University of Pennsylvania in 1888. He wrote *Theory of Social Forces, Development of English Thought, The New Basis of Civilization, Product and Climax,* etc.

Patti (pat'ē), ADELINA MARIA CLORINDA, opera singer, born at Madrid in 1843; received her musical training from her brother-in-law, Maurice Strakosch; made her first appearance in New York in 1859 as *Lucia;* and in 1861 made a brilliant début at Covent Garden, London, in the parts of *Amina, Violetta, Zerlina,* and *Martha.* Subsequently she successfully established her

reputation as an artiste in the chief cities of Europe and America. She married three times, to the Marquis de Caux, 1868, Signor Nicolini, 1883, and Baron Cederstrom, 1899. She died at Craig-y-Nos Castle, Wales, Sept. 27, 1919.

Pattison (pat'i-sun), MARK, an English writer, born in 1813; died in 1884. He was educated at Oriel College, Oxford; received a fellowship in 1839, and two years subsequently he was ordained and won the Denyer theological prize. In 1853 he was appointed tutor of his college, and in 1861 became rector (or head) of Lincoln College. He devoted himself to university reform, for this purpose made many journeys to Germany, and was assistant-commissioner on the educational commission of the Duke of Newcastle. He was a contributor to the famous *Essays and Reviews*, and published an edition of Pope's *Epistles and Satires* (1869), a work on Isaac Casaubon (1875), a memoir of Milton in the *Men of Letters Series* (1879), the *Sonnets of Milton*, etc.

Pau (pō), a town of France, capital of the department of Basses-Pyrénées, formerly of Béarn, picturesquely situated on a height above the right bank of the Gave-de-Pau, in view of the Pyrenees (10 miles distant), and 58 miles E.S.E. of Bayonne. The most interesting edifice is the castle in which Henry IV was born, crowning a rising ground and overlooking the Gave-de-Pau. It is a large irregular structure, flanked with six square towers. The oldest part is supposed to date from 1363, and the whole is well preserved. Pau is a favorite winter resort, enjoying a mild dry climate and a peculiar stillness of the atmosphere, with no sudden variations of temperature. Pop. (1911) 37,149.

Pauchonti (pą-chon'ti; *Isonandra polyandra*), a large tree found in the mountain regions of India, and from which a substance of the nature of gutta-percha is procured. The wood of the pauchonti is close-grained and heavy.

Paul (pąl), the apostle, commonly called SAINT PAUL, was born of Jewish parents at Tarsus, in Cilicia, and inherited the rights of a Roman citizen. He received a learned education, and early went to Jerusalem to study under Gamaliel, one of the most celebrated Jewish rabbins. Thus prepared for the office of teacher, he joined the sect of the Pharisees, and became a persecutor of the Christians, to crush whom the sanhedrim employed him both in and out of Jerusalem. He was present at and encouraged the stoning of Stephen, and it was only when he was overtaken by a vision on his way to Damascus that he became a convert to Christianity. His sudden conversion was indicated by the change of his name from *Saul* to *Paul*, and he engaged in the work of an apostle with an ardor that overcame every difficulty. Arabia, Syria, Asia Minor, Greece, and the islands of the Mediterranean were the scenes of his labors. The churches of Philippi in Macedonia, of Corinth, Galatia, and Thessalonica, honored him as their founder; and he wrote epistles to these churches, and to the churches in the chief cities of Greece and Asia Minor. By admitting the Gentiles to the church he incurred the hatred of the Jews, who persecuted him as an apostate. Undismayed, the apostle went to Jerusalem, and was there arrested and brought to Cæsarea, where he was kept a prisoner for two years by the Roman governors Festus and Felix. He appealed, as a Roman citizen, to the emperor; and on his way to Rome, where he arrived in the year 62, he was shipwrecked on the island of Melita. At Rome he was treated with respectful kindness, and there is reason to believe that he for some time regained his liberty. According to the tradition of the early church the apostle suffered martyrdom during the reign of Nero.

Paul, the name of five popes — PAUL I, pope from 757–767, brother of Stephen II, stood on good terms with Pepin and Charlemagne.— PAUL II, pope from 1464–71, a native of Venice, originally called Pietro Barbo, caused a crusade to be preached against the Hussites. — PAUL III, pope from 1534–49, formerly Alessandro Farnese, excommunicated Henry VIII, 1535, concurred in the foundation of the order of Jesuits, opened the Council of Trent, defended himself by his legates in the conferences between Catholics and Protestants at the diets of Worms and Ratisbon, and established a general inquisition for the suppression of the Protestant revolt.— PAUL IV, pope from 1555–59, formerly John Peter Caraffa, energetically directed the power of the Inquisition against the Protestant movement, and established an Index Librorum Prohibitorum.— PAUL V, pope from 1605–21, formerly Camillo Borghese, succeeded Leo XI.

Paul I, Emperor of Russia, son of Peter III and Catharine II, was born in 1754. On the death of Catharine in 1796 he succeeded to the throne, and began his reign with acts of generosity. He put an end to the war with Persia, and liberated the Poles who were in confinement in Russia. He

joined the coalition of crowns against France, and sent 100,000 men, under Suwaroff and Korsakoff, to Italy and Switzerland, and partly to Holland, but he afterwards favored the cause of Napoleon. Paul caused himself to be declared Grandmaster of the Knights of Malta (1798), but Britain, having conquered the island in 1800, refused to surrender it to the Russian emperor. He therefore laid an embargo on all British ships in the Russian ports, and prevailed upon the Swedish, Danish, and Prussian courts to enter into a convention against Great Britain. At length (1801) the internal administration and his increasing acts of tyranny gave rise to a strong popular discontent, and he was murdered in his bed, March 24, 1801.

Paul, ST. VINCENT DE, Roman Catholic philanthropist, born of poor parents in Southern France in 1576; died in 1660. He was educated at Dax and Toulouse; ordained a priest in 1600; in 1605 he was captured by pirates; remained in slavery in Tunis for two years, and finally escaped to France. He afterwards visited Rome, from which he was sent on a mission to Paris, where he became almoner to Queen Margaret of Valois. In 1616 he began the labors which occupied so large a portion of his life, and which included the foundation of the institution called the Priests of the Mission or Lazarists, the reformation of the hospitals, the institution of the Sisterhood of Charity, the instruction of idiots at his Priory of St. Lazare, etc. Among the last acts of his life was the foundation of an asylum for aged working people of both sexes, and a hospital for all the poor of Paris, which was opened 1657. He was canonized in 1737.

Paula, FRANCIS DE. See *Francis of Paula.*

Paulding (pâl'ding), JAMES KIRKE, miscellaneous writer, born in Dutchess county, New York, in 1779; died in 1860. He removed to New York, where he became intimately acquainted with Washington Irving, and published in connection with him a series of humorous and satirical essays, entitled *Salmagundi.* For some years he was secretary of the United States navy. He published a second series of *Salmagundi,* entirely his own composition; several novels, among which are *Konigsmarke,* and the *Dutchman's Fireside;* a *Life of Washington;* and many political pamphlets, poems, etc.

Pauli (pâ'lē), REINHOLD, historical writer, born at Berlin in 1823; died in 1882. He was educated at Berlin and Bonn; resided in London for eight years, where he was secretary to the Prussian minister, and afterwards became a professor successively at Rostock, Tübingen, and Göttingen. His published works are: a *Life of King Alfred* (1851), a continuation of Lappenberg's *History of England,* a *History of England since the Treaties of 1814 and 1815, Pictures of Old England,* a monograph on Simon de Montford, and *Essays on English History.*

Paulicians (pâ-li'shē-ans), a Christian sect founded in the 7th century in Armenia. They rejected the adoration of the Virgin and the saints; refused homage to the cross; denied the validity of the sacraments; interpreted spiritually baptism and the Lord's supper; would not recognize any priestly dignity; and their public worship was altogether free from ritual. They suffered severe persecution at the hands of the Byzantine emperors, but as late as the 16th century remnants of the sect were found in Bulgaria.

Paul's Cathedral, ST., a famous religious edifice of London, England, is situated on Ludgate Hill, an elevation on the north bank of the Thames. The site of the present building was originally occupied by a church erected by Ethelbert, king of Kent, in 610. This was destroyed by fire in 1087, and another edifice, Old St. Paul's, was shortly afterwards commenced. The structure was in the Gothic style, in the form of a Latin cross, 690 feet long, 130 feet broad, with a lead-covered wooden spire rising to the height of 520 feet. The middle aisle was termed Paul's Walk, from its being frequented by idlers as well as moneylenders and general dealers. Old St. Paul's was much damaged by a fire in 1137, by lightning in 1444, again by fire in 1561, and was utterly destroyed by the great fire in 1666. The ruins remained for about eight years, when the rebuilding was taken in hand by the government of Charles II (1675–1710). The whole building was completed at a total cost of £1,511,202 by Sir Christopher Wren, architect. The building is of Portland stone, in the form of a cross. Its length is 510 feet; the width from north to south portico 282 feet; the general height is 100 feet. The whole is surmounted by a great dome raised on eight arches. Above the dome is a lantern or gallery terminated above by a ball and gilded cross, 404 feet from the pavement beneath. The crypt under the nave contains the burying places of many illustrious personages, and some interesting relics of old St. Paul's. Among the

numerous monuments and statues to the illustrious dead may be noted those of John Howard and Dr. Johnson, by Bacon; statues of Nelson, Earl Howe, and Sir Joshua Reynolds, by Flaxman; Bishop Heber, by Chantrey; and monuments to Lord Rodney, Lord Heathfield, Admiral Collingwood, General Abercrombie, etc., by Rossi, Westmacott, and others. The monument to the Duke of Wellington, by Alfred Stevens, is accounted the finest work of its kind in England. It consists of a rich marble sarcophagus and canopy elaborately ornamented with bronze sculptures. It is 30 feet in height and cost upwards of £30,000.

Paul's Cross, St., a structure partly consisting of a pulpit which stood at the north side of old St. Paul's, London; a favorite place of resort, from which sermons, political discourses, etc., used to be delivered. It was demolished in 1643.

Paul's School, St., a London grammar or secondary school, endowed by John Colet in 1512 for 153 boys of 'every nation, country, and class.' The first building, on the east of St. Paul's Churchyard, was burned in 1666; the second, by Wren, was taken down in 1824 and another building erected. In 1884 a new school was opened at West Kensington. The Mercer's Company are patrons.

Paulus Ægineta (pą'lus ē-ji-ne'-ta), a Greek medical writer, born, it is supposed, in the 7th century in the island of Ægina, and connected with the medical school at Alexandria. He abridged the works of Galen, and was deeply read in those of Hippocrates and others. His works have been translated into English.

Paulus Diaconus (di-ak'o-nus), an Italian ecclesiastic, born about 730; died about 800. He was educated in the court of the Lombard kings at Pavia. In 781 he was called to the court of Charlemagne, and was one of the principal instruments of the intellectual reforms effected by the emperor in the countries of Western Europe. Paulus drew up a book of homilies from the fathers, wrote a history of the bishops of Metz, and a history of the Lombards.

Paul Veronese. See *Veronese.*

Pauperism. See *Poor* and *Poor Laws.*

Pausanias (pą-sā'ni-us), a Lacedæmonian general, nephew of Leonidas. He commanded the allied Greeks against the Persians at the battle of Platæa in 479 B. C. To himself alone he ascribed the victory, and his pretensions became insupportable when he afterwards, with a combined Greek fleet, delivered Greece, Cyprus, and finally Byzantium from the Persian rule. At length he entered into secret negotiations with Xerxes, and conceived the design of making himself master of Greece. To escape arrest he sought shelter in the temple of Athene at Sparta, where he was shut in by the enraged people and starved to death (B. C. 467).

Pausanias, a Greek writer on mythology, history, and art, who lived in the 2d century after Christ, and of whose personal history nothing is known. His *Hellados Periēgēsis* ('Peregrination of Hellas') is an itinerary in ten books of his travels, which were extensive. He appears to have visited the whole of the Peloponnesus, Rome, Syria, and Palestine. He describes temples, theaters, tombs, statues, pictures, monuments of every sort. He also mentions mountains, rivers, and fountains, and the mythological stories connected with them. His observation is accurate, and his description simple and reliable.

Pausilippo. See *Posilipo.*

Pavement (pāv'ment), a floor or covering consisting of stones, blocks of wood, etc., laid on the ground in such a manner as to make a hard and convenient roadway. Pavements of lava, with elevated sidewalks, are found in the ancient Roman cities of Herculaneum and Pompeii, and the paving of important highways was practiced by the Romans. Of modern cities Paris is generally mentioned as having the oldest pavement; but it is certain that Cordova, in Spain, was paved about 850 A. D. In London some of the chief streets were paved in the 15th century. Holborn was first paved in 1417, the great Smithfield Market not until 1614. Street pavements in modern cities are usually of stone, asphalt, concrete, or wood. The stone commonly used for the carriage way is granite, blocks of which are placed upon a solid bed of concrete, and the interstices filled with sand and grouted with asphalt, lime, or cement. Concrete pavement is composed of broken stone, etc., mixed with Portland or other cement or asphalt. (See *Concrete.*) Trinidad and Venezuelan asphalt is now much used for paving city streets, and bricks and wood blocks are coming into use. Wood pavements have the advantage of being noiseless, and some recent pavements of this kind are very durable. They are laid in different ways, but the

blocks which form the pavement are always placed on their ends, so that the cross surface of the wood is exposed. The spaces between the blocks are usually filled with gravel, upon which hot tar or pitch is poured.

Pavia (pä'vi-a; Italian pron. pä-vē'ä), a city of Italy, in Lombardy, 22½ miles from Milan, on the left bank of the Ticino, capital of a province of the same name. Pavia is still partly surrounded by old walls and fortifications, and is connected with the Adriatic by the Po and Ticino, and with Milan by a canal. Of edifices the most important are the cathedral (begun in 1486), containing some good paintings, and the tomb of St. Augustine; the church of San Michele, a Romanesque edifice of the 11th century; the Castello, or castle, now a barrack, erected by Galeazzo Visconti, 1360–69; the university, founded in 1361, a handsome building, with a library of about 130,000 volumes; the Collegio Borromeo, etc. The manufactures are unimportant. About 4 miles to the north is the famous Carthusian monastery Certosa di Pavia, with a magnificent church in the Gothic style, begun 1396, and with a façade that ranks as the finest decorative work of the kind in North Italy. Pavia was a place of considerable importance during the reign of Augustus. It afterwards came into the possession of the Lombard kings, who made it their capital. It was latterly under the Milanese. Pop. (1914) 40,266.—The province, which extends on both sides of the Po, has an area of 1285 square miles, partly covered by the Apennines. Pop. 504,382.

Pavilion (pȧ-vil'yun), in architecture, a turret or small building, usually isolated, having a tent-formed roof, whence the name. A projecting part of a building, when it is carried higher than the general structure and provided with a tent-formed roof, is also called a pavilion.

Pavlograd (pȧv-lō-grȧt'), a town of Southern Russia, 16 miles northeast of Ekaterinoslav, in the government of that name. Pop. 17,188.

Pawl (pȧl), a short piece or bar moving round a pivot at one end, so as to catch in a notch or projection of a revolving body and prevent motion in one direction, as in the capstan or windlass of a ship.

Pawnbroker (pȧn'brō-kėr), a person who lends money on goods *pledged* or deposited at a legally fixed rate of interest, and under the restriction of a government license. Although this mode of borrowing is occasionally taken advantage of by all classes, and bankers, when they accept security for their advances, act on the same principle as the pawnbroker, the business, as a special one, originates chiefly in the necessities of the poor. In the middle ages lending upon pledges was a trade almost exclusively pursued by Jews and Lombards. On the European continent this form of borrowing is partly conducted by charitable institutions called Monts de Piété (which see). In England pawnbrokers were recognized by statute in the reign of James I, and in 1872 an act was passed to consolidate all the acts relating to pawnbrokers in Great Britain; but it does not extend to Ireland. In the United States the several states have each their own laws governing pawnbroking. Pawnbrokers have been taxed $20 annually by the Federal government since July 1, 1898.

Pawtucket (pȧ-tuk'et), a city of Providence county, Rhode Island, 4½ miles N.N.E. of Providence. It is situated at the head of navigation of Narragansett Bay, on the Pawtucket River, which has a fall of 50 feet, yielding water power. Cotton manufacture in the United States began in this city. Calico printing is done here on the largest scale. The thread works are the largest in the country, and there are extensive bleaching and dyeing factories. Pop. (1910) 51,622; (1920) 64,248.

Pawhuska (pȧ-hus'ka), a city, county seat of Osage Co., Oklahoma, 40 miles N. W. of Tulsa. It is located in the heart of the rich Osage oil fields, with a daily production (1920) of 60,000 barrels; and is the capital of the Osage Nation, the richest Indian tribe in the world. Fifty large oil, gas and pipe line companies and nine oil-well supply houses operate through Pawhuska. It has oil refinery, lumber yards, and very extensive cattle interests; Indian agency and government school. Pop. 6414.

Paxo (pak'so; anciently *Paxos*), one of the Ionian Islands, belonging to Greece, 9 miles south of Corfu. It is nearly 5 miles long and 2 broad, and consists of a mass of limestone rock. Principal product, olive oil of the finest quality. Pop. about 5000.

Paxton (paks'tun), Sir Joseph, landscape gardener and architect, born in Bedfordshire in 1803; died in 1865. He was educated at the free school of Woburn; became gardener, and afterwards estate manager, to the Duke of Devonshire at Chatsworth, in Derbyshire; designed the Crystal Palace for the great International Exhibition (London) in

1851, and soon after was knighted. He edited the *Horticultural Register*, the *Magazine of Botany*, the *Cottage Calendar*, and was the author of a *Pocket Botanical Dictionary*. He was elected member of Parliament for Coventry in 1854, and continued to represent it until his death.

Pax-wax, the name given to the strong, stiff tendons running along the sides of the neck of a large quadruped to the middle of the back, as in an ox or horse. It diminishes the muscular effort needed to support the head in a horizontal position.

Paymaster (pā'mas-tėr), an officer in the army and navy, from whom the officers and men receive their wages, and who is intrusted with money for that purpose. In matters of general discipline the paymaster is subordinate to the commanding officer of his regiment. The paymaster of a ship in the navy has a general charge of the financial department in the vessel.

Payn (pān), JAMES, novelist, born at Cheltenham, England, in 1830; educated at Eton, Woolwich Academy, and Trinity College, Cambridge; published two volumes of verse; contributed to the *Westminster Review* and *Household Words;* became editor of *Chambers's Journal* in 1858, and of the *Cornhill Magazine* in 1882. He published innumerable novels, of which the following may be mentioned: *Lost Sir Massingberd, A County Family, Found Dead, By Proxy, The Talk of the Town, The Luck of the Darrels, The Heir of the Ages.* He died in 1898.

Payne, JOHN HOWARD, was born in New York in 1792. He adopted the stage as his profession, but is especially known as the author of the favorite song of *Home, Sweet Home.* In 1851 he was sent as consul to Tunis, where he died in 1852.

Pays de Vaud (pa-ē dė vō). See *Vaud.*

Paz, LA. See *La Paz.*

Pea (pē), a well-known leguminous plant of the genus *Pisum*, the *P. sativum* of many varieties. It is a climbing annual plant, a native of the south of Europe, and has been cultivated from remote antiquity. It forms one of the most valuable of culinary vegetables; contains much farinaceous and saccharine matter, and is therefore highly nutritious. It is cultivated in the garden and in the field. Its seed-vessel is a pod containing one row of round seeds, which are at first soft and juicy, in which state they are used for the table under the name of *green peas.* They afterwards harden and become farinaceous. A whitish sort, which readily split when subjected to the action of millstones, is used in considerable quantities for soups, and especially for seastores. There is a blue sort which answers the same purpose.

Pea-beetle, a coleopterous insect (*Bruchus pisi*) about ¼ inch long, black, with white spots and dots on the wing-cases, very destructive to crops of peas in the south of Europe and in North America. Called also *Pea-bug, Pea-chafer,* and *Pea-weevil.*

Peabody (pē'bo-di), GEORGE, philanthropist, born at Peabody, Massachusetts, in 1795; died in 1869. In 1837 he went to London and established the firm of George Peabody & Co., exchange brokers and money-lenders. Having acquired a large fortune, he gave $200,000 to establish a free library in his native town; presented $1,000,000 to found a free library and institute of art and science at Baltimore; and in 1862 placed $750,000 in the hands of trustees for the benefit of the poor of London, to be employed in building model dwelling houses. He afterwards added $1,750,000 to this benefaction. In 1866 he made a gift of $2,100,000, afterward increased to $3,500,000, for the cause of education in the South. In the same year he gave $150,000 to Harvard University to found a museum for anthropological and archæological research. This institution has sent out many exploring expeditions and done very valuable work.

Peabody, a town of Essex Co., Massachusetts, 2 miles W. of Salem. It contains the Peabody Institute, with a large library and a collection of paintings, etc. The place was named in honor of George Peabody, who was born here, and has leather and other manufactures. Pop. (1920) 19,552.

Peace Conference. The most momentous conference in history was that which met in Paris, Jan. 18, 1919, following the Great War. (See next article.)

Peace, INTERNATIONAL. The first national movement in the direction of bringing about a permanent condition of peace between the nations, of an international character, was the conference held in 1899, at The Hague, Holland, at the suggestion of the Czar of Russia, to consider what could be done in the way of reducing the armaments of the nations and inducing them to settle their differences by arbitration instead of war. The most important result of this conference of the nations was the establishment at The Hague of a Permanent Interna-

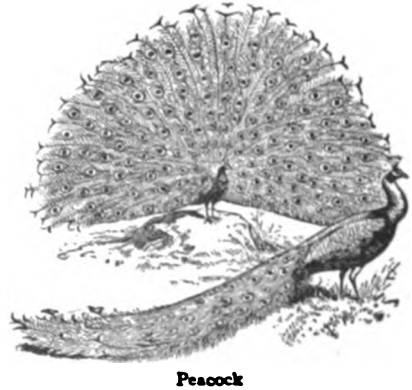
tional Court of Arbitration, which settled amicably a number of international disputes. One of the most important of these was the settlement in 1910 of the long-standing fishery controversy between the United States and Great Britain. A second conference was held at The Hague in 1907. The Hague Tribunal was unable to settle the larger disputes, and at about the time a third conference was planned the greatest war in all history broke out. (See *European War.*) The Nobel Peace Prize was given to President Roosevelt in 1906 in recognition of his useful services in bringing about a treaty of peace between Russia and Japan. The Peace Prize was awarded to Elihu Root in 1912, and to President Wilson in 1920. Andrew Carnegie, in December, 1910, donated the sum of $10,000,000, the income of which was to be used in the support and furtherance of all movements toward peace. The American Peace Society, a long-standing institution, held several notable congresses. Among other American peace organizations may be mentioned the League of Nations Union (formed from a union of the New York Peace Society and the World's Court League), the League to Enforce Peace (under the presidency of Hon. Wm. H. Taft), the World Church Alliance, the American Peace and Arbitration League (incorporated 1909).

At the peace conference which followed the European war a plan for a League of Nations (q. v.), strongly urged by President Wilson, was incorporated with the treaties of peace with Germany and her allies (see *Treaty*). The conference convened at Paris, Jan. 18, 1919, and the treaty with Germany, which included the Covenant of the League of Nations, was signed by representatives of the belligerent powers, June 28, 1919. The first meeting of the assembly of the League of Nations was held at Geneva, Switzerland, November 15, 1920. The treaty of peace between the United States and Germany was signed August 25, 1921. A conference on the Limitation of Armaments began at Washington in November, 1921. See *Armaments Limitation Conference.*

Peace River, a large river of Canada, which rises in the mountains of British Columbia, flows northeastwards, receives the drainage of Lake Athabasca, and finally enters the Great Slave Lake under the name of the Slave River. It is 600 miles in length.

Peach (pēch), a tree and its fruit, of the almond genus (order Rosaceæ), the *Amygddlus persica*, of many varieties. This is a delicious fruit, the produce of warm or temperate climates. The tree is of moderate stature, but varies in this respect according to soil and climate. The varieties of the fruit, which is a large downy drupe containing a stone, are very numerous, differing in size, flavor, and time of ripening, but they are principally of two sorts, the *free-stones* and the *cling-stones*, so called according as the stone separates readily or adheres to the flesh. The peach-tree is supposed to have been introduced into Europe from Persia. In the United States it is very extensively cultivated. The peach regions include Delaware, Maryland, Georgia, Michigan, the eastern and southern shores of the Great Lakes, New Jersey, California, and parts of Missouri, Alabama, Kansas, Arkansas, Louisiana, Colorado and Texas. The ripe fruit is occasionally distilled and made into peach brandy.

Peacock (pē'kok), called also PEAFOWL, a large and beautiful gallinaceous bird of the genus *Pavo*, properly the male of the species, the female being, for distinction's sake, called



Peacock

a *peahen*. The common peacock, *P. cristātus*, is a native of India and Southeastern Asia. This bird is characterized by a crest of peculiar form, and by the tail coverts of the male extending far beyond the quills, and being capable of erection into a broad and gorgeous disk. The shining, lax, and silky barbs of these feathers, and the eye-like spots which decorate their extremities, are known to every one. The colors and plumage are said to be more brilliant in the wild than in the domesticated state. The wild peahen lays from twenty-five to thirty eggs, and produces only a single brood in each year. The young birds of both sexes are feathered alike for the first two years, and in the third year the tail-coverts of the male begin to be developed and to

assume their lustrous appearance. The black-shouldered or Japan peacock (*P. nigripennis*) is regarded as a variety of the common species; the Javan peacock (*P. muticus*) is a distinct form.

Peacock, THOMAS LOVE, an English writer, born in 1785; died in 1866. His first important work was a novel entitled *Headlong Hall*, published in 1815, and this was followed by *Melincourt, Nightmare Abbey, Maid Marian, The Misfortunes of Elphin, Crotchet Castle, Grylll Grange*, and a poem called *Rhododaphne*. He was the friend and executor of Shelley, and was connected with the East India Office for nearly forty years.

Peacock-butterfly, a name given by collectors of insects to butterflies of the species *Vanessa Io*, from the eyes on their wings resembling the eyes on peacocks' feathers.

Peacock-fish, a fish of the Mediterranean and Indian seas (*Crenilabrus pavo*), characterized by the brilliancy of its hues — green, yellow, and red.

Pea-crab, a small brachyurous crustacean of the genus *Pinnothēres*, which lives in the shells of oysters, mussels, and other bivalves. There are several species in the United States.

Peak (pēk), or HIGH PEAK, a district of England, forming the northwest angle of Derbyshire, and consisting of a wild and romantic tract, full of hills, valleys, and moors, and celebrated for its limestone caverns and grottoes.

Peale (pēl), CHARLES WILSON, painter and naturalist, was born at Charlestown, Maryland, in 1741; died in 1827. He studied under West in England, and afterwards settled in Philadelphia, where he won a high reputation as a portrait painter. He was one of the founders of the Academy of the Fine Arts, and formed in Philadelphia a museum of natural curiosities, containing the skeleton of a mammoth. It was known as Peale's Museum.

Peale (pēl), REMBRANDT, artist, son of the preceding, was born in Bucks county, Pennsylvania, in 1778. When 17 years old he executed a portrait of Washington, from whom he had three sittings. He painted portraits of many distinguished men. He was president of the American Academy, and also one of the original members of the Academy of Design. His portrait of Washington (1823) was purchased by Congress. He died in 1860.

Pea-maggot, the caterpillar of a small moth which lays its eggs in peas.

Pea-nut. Same as *ground-nut*.

Pear (pār), a tree of the genus *Pyrus*, order Rosaceæ, the *P. communis*, growing wild in many parts of Europe and Asia, and from which the numerous cultivated varieties have originated. The fruit is characterized by a saccharine aromatic juice, a soft and pearly liquid pulp, melting in the mouth, as in the butter-pear; or by a firm and crisp consistence, as in the winter bergamots. The pear is chiefly propagated by grafting or budding on the wild pear stock, or on stocks raised from the seeds of cultivated pears, called free stocks. It is also grafted on the quince, the medlar, and the white thorn. At the present day more than 200 varieties are enumerated, and constant accessions are made every year. France and the north of Italy are celebrated for the perfection to which they have carried the culture of this fruit, and it is largely cultivated in the United States. Numerous varieties are cultivated solely for the purpose of making perry, a liquor analogous to cider, and prepared nearly in the same manner. The wood is fine-grained, of a yellowish color, and susceptible of a brilliant polish. In the early ages of Greece it was employed in statuary; now it is used for musical instruments, the handles of carpenters' tools, in wood-engraving, etc.

Pearl (perl), the name applied to a concretion produced within the shells of certain species of bivalve molluscs as the result of some abnormal secretory process. These concretions are highly valued, and are classed among the gems. The production of a pearl is generally begun by the introduction of some foreign body, such as a grain of sand, within the mantle-lobes. The presence of this body has the effect of setting up an irritant action, resulting in the deposition by the mantle of a quantity of nacreous material over the offending particle. This material, in certain species of molluscs, is of such a texture and character, and is deposited in such regular laminæ or layers, that in due time the structure known as a 'pearl,' varying in worth and brilliancy, is formed. Chief among such molluscs are the pearl-oyster (*Meleagrina margaritifēra*), the pearl-mussel (*Avicula margaritifēra*), and the fresh-water mussels (genus *Unio*).

The chief pearl-oyster fisheries are those of Ceylon, which, together with the fisheries in the Persian Gulf, were known to the ancients. The chief seat of the Ceylon fishery is in the Gulf of Manaar, on the northeast of the island. It be-

gins in February or March, and extends over a period of about a month, a large fleet of boats usually being engaged in it. The average depth at which the oysters are found varies from 60 to 70 feet, and the divers are let down by a stout rope weighted by a heavy stone. Having gathered a number of the oysters into a net, at the end of half a minute or so the diver is pulled up. The oysters being carried to shore, and laid in piles, in about ten days become thoroughly decomposed. They are then thrown into seawater, and carefully examined for pearls; while the shells, after being cleaned, are split into layers for the sake of the mother-of-pearl. The pearl-fisheries of Ceylon are a government monopoly, but the revenue derived from them is not a regular one, the fishery sometimes failing for years in succession. There was no fishery, for example, between 1837 and 1854, or between 1863 and 1874. The best pearls are found about Ceylon, Persia, and other eastern coasts, and inferior ones on the tropical coasts of America. The pearl-oyster occurs throughout the Pacific. Very fine pearls are obtained from the Sulu Archipelago on the north-east of Borneo. Of late years pearl-fishing has been started with considerable success in Australian seas; and it is carried on also in the Gulf of Mexico, upon the coast of California, and in the vicinity of Panama. Pearls are also to some extent obtained from the fresh-water mussels of the streams, especially in China, also in the United States and Germany. The British rivers have yielded valuable pearls, but the fisheries there are now neglected as unprofitable, and findings of this kind in the United States are only occasionally made.

Pearls have formed valued articles of decoration and ornament from the earliest times. Julius Cæsar presented Servilia, the mother of Marcus Brutus, with a pearl valued in modern computation at $240,000; while Cleopatra is fabled to have swallowed one gem valued at $300,000 or $400,000. A pearl purchased by the traveler Tavernier is alleged to have been sold by him to the Shah of Persia for £180,000. The 'Pilgrim' pearl of Moscow is diaphanous in character, and weighs 24 carats.

Artificial pearls are largely made in France, Germany, and Italy, the pearl being very well imitated by the scales of certain fishes. A substitute for black pearls is found in close-grained hæmatite, not too highly polished, and pink pearls are imitated by turning small spheres out of the rosy part of the conch-shell.

Pearl, Mother or. See *Mother-of-pearl.*

Pearl-ash, the common name for carbonate of potassium. See *Potash.*

Pearl Barley. See *Barley.*

Pearl Moss, the same as *Carrageen* (which see).

Pearl Powder. See *Bismuth.*

Pearl Stone, a felspathic mineral, consisting of silicate of aluminum with varying quantities of iron, lime, and alkalies; it occurs in spherules, which have a pearly luster.

Pearse, Padraic, Irish lawyer, educator, and president of the short-lived Irish Republic, which lasted for a week in April, 1916. Although at first holding to the belief that Ireland's independence could be obtained by peaceful methods he allied himself with the extreme Sinn Fein movement which culminated in the revolt of April 24, 1916, on which day the Republic of Ireland was proclaimed, Padraic Pearse signing the proclamation as President. After seven days of severe fighting, with hundreds of casualties, Pearse surrendered. He was taken to England, tried by court martial, and executed May 3, 1916.

Peary, Robert Edwin, a famous Arctic explorer, was born at Cresson Springs, Pennsylvania, in 1856, and entered the civil engineer corps of the United States Navy in 1881. His first expedition northward was made in 1886, when, with one companion, he penetrated the Greenland ice-cap for 100 miles in lat. 69° 30′ N. In 1891, with a party of six, he went to Northern Greenland and made a brilliant sledge journey of 1300 miles, crossing Greenland to its Atlantic coast and discovering Independence Bay in lat. 81° 37′ N. He made a second expedition in 1893-95, again crossing Greenland, and in 1897 voyaged to Cape York and brought back an immense meteorite discovered there. In 1898 he went north again, on this occasion the discovery of the North Pole being his main object. He remained until 1902, making efforts to cross the ice of the Arctic Sea by means of dog sledges, and reaching the high altitude of 83° 39′ N. lat. He also traced the north coast of Greenland, thus proving Greenland to be an island. In 1905 the indefatigable explorer set out again and in this expedition reached 87° 6′ N. lat., the highest point to that date attained in the northern seas. Dissatisfied with his achievements while the pole remained

undiscovered, he embarked on a sixth expedition in 1908, and in the spring of 1909 achieved the purpose to which his life had been devoted, attaining the pole, the northern extremity of the earth, on April 6. For a time it seemed as if the honor of this great achievement would be lost to him, Dr. Frederick A. Cook, of Brooklyn, who had been for a year or two lost to sight in the North, returning on Sept. 1, 1909, with the statement that he had reached the pole on April 21, 1908. Investigation of his story, however, proved its falsity, and the full credit of the discovery was left to the unwearying Peary. He died Feb. 20, 1920.

Peasant Proprietors (pez'ant), the owners of relatively small estates of land which they cultivate themselves; the term deriving its specific meaning and importance from the theories of a class of economists represented on the European Continent by Sismondi, and in Britain by John Stuart Mill. See *Land*.

Peasants' War, a great insurrectionary movement among the German peasantry, which in 1525 spread over the whole of Germany. The immediate cause of this movement was religious fanaticism, but the pent-up forces by which it was impelled grew out of the long course of oppression to which feudal customs and priestly tyranny had subjected the people. Before the Reformation, particularly from 1476 to 1517, a series of popular commotions and insurrections had broken out in various parts of Southern Germany, without procuring any relaxation of burdens. The Reformation gave hopes of relief, and though Luther and Melanchthon opposed the idea of carrying out a religious and a social revolution simultaneously, a general ferment among the peasantry came to a head on Jan. 1, 1525, with the capture of the convent of Kempten (Bavaria). A general unorganized rising of the German peasantry followed, fearful excesses and atrocious cruelties were committed, but in a few months the mobs were dispersed or massacred by the soldiery of the nobles. It is estimated that 150,000 persons lost their lives in these risings, which for the time gave a severe blow to the Reformation. See also *Anabaptists; Jacquerie.*

Pea-stone, or PISOLITE (pis'o-līt), a limestone rock, composed of globules of limestone about the size of a pea, usually formed round a minute grain of sand or other foreign body, and joined with a cement of lime. In pisolitic rocks belonging to the Oolitic period ironstone is frequently found.

Peat (pēt), a kind of turfy substance consisting of vegetable matter which has accumulated by constant growth and decay in hollows or moist situations on land not in a state of cultivation, always more or less saturated with water, and consisting of the remains, more or less decomposed, of mosses and other marsh plants. Peat is generally of a black or dark-brown color, or when recently formed, of a yellowish-brown; it is soft and of a viscid consistence, but it becomes hard and darker by exposure to the air. When thoroughly dried it burns, giving out a gentle heat without much smoke; accordingly it is used as fuel.

Pea-weevil. See *Pea-beetle.*

Peba (pē'ba), a species of the armadillo (*Tatusia septemcinctus*) found in various parts of South America. Its flesh is much valued by the natives.

Pebble (peb'l) in jewelry, a name commonly given to an agate. Scotch agates are commonly known as *Scotch pebbles.*

Pebrine (peb'rin), a French name for a destructive epizoötic disease among silkworms due to internal parasites, which swarm in the blood and all the tissues of the body, passing into the undeveloped eggs of the females, so that it is hereditary, but only on the side of the mother. It is contagious and infectious, the parasitic corpuscles passing from the bodies of the diseased caterpillars into the alimentary canal of healthy silkworms in their neighborhood.

Pecan (pē-kan'), PECAN-NUT, a species of hickory (*Carya oliveæformis*) and its fruit, growing in the United States, especially in Texas. It is a large tree, with hard, very tough wood, pinnate leaves, and catkins of small flowers. The nut it yields is very palatable and is a favorite for table use.

Peccary (pek'a-ri; *Dicotyles*), a genus of Ungulate quadrupeds, included in the Artiodactyle ('even-toed') section of that order, and nearly allied to swine, in which family (Suidæ) the genus is classified. These animals are exclusively confined to America, in which continent they represent the true swine of the Old World. In general form the peccaries resemble small pigs. The best-known species are the collared peccary (*Dicotyles torquātus*) and the white-lipped peccary (*D. labiātus*). The former occurs abundantly in South America, and also extends into North America, living generally in small flocks, which do not hesitate to attack with their tusks any one who meddles with them. Their food consists of maize,

potatoes, sugar-cane, and similar materials, and cultivated fields suffer much from their raids. This species of peccary is readily domesticated. The flesh is savory, and less fat than pigs' flesh. *D. labiatus* is exceedingly pugnacious and is a dangerous animal to encounter. The peccary possesses a glandular sac or pouch, situated in the loins, which secretes a strongly-smelling fluid of fœtid nature. This must be cut away immediately on killing a peccary, to avoid contaminating the flesh.

Pechili (pa-che-le), or CHILI, a Chihli or northern province of China, traversed by the Peiho and containing Peking, the national capital. It has coal, iron and other deposits, and the soil is fertile. Area, 115,800 sq. miles; pop. 20,937,000.

Peck (pek), the fourth part of a bushel; a dry measure of 8 quarts for grain, pulse, etc. The standard or imperial peck contains 2 gallons or 554.548 cubic inches.

Peck, HARRY THURSTON (1856-1914), an American educator and author, born at Stamford, Conn., graduated from Columbia University in 1881. He was the first editor of the *Bookman* (1895); literary editor of New York *Commercial Advertiser;* co-editor of the *New International Encyclopedia.* He wrote a *History of Classical Philology, Life of Prescott, Twenty Years of the Republic,* a collection of poems under the title *Greystone and Porphyry.*

Pecopteris (pe-kop'tĕr-is), the name given to a genus of fossil ferns occurring in the Coal-measures, New Red Sandstone, and Oolite, from the comb-like arrangement of its leaflets.

Pecos River (pā'kōs), a river of New Mexico and Texas, which has a southeasterly course of about 800 miles, and falls into the Rio Grande del Norte, but in summer is generally dry.

Pecquet (pek-ā), JEAN, born at Dieppe, France, about 1620; died in 1674. He studied medicine, and especially anatomy, at Montpellier, in his studies discovering and demonstrating the course of the lacteal vessels in the human body.

Pecten (pek'ten), a genus of Lamellibranchiate Mollusca, included in the oyster family (Ostræidæ), and popularly designated under the name of 'scallop-shells.' Numerous species of pecten — 180 or more — are known. The common pecten (*P. operculâris*) and the frill or great scallop (*P. maximus*) are the most common forms. The latter form is esteemed a delicacy. The shell of this species was borne in the middle ages by pilgrims in their hats, as a sign that they had visited the Holy Land. The shell is somewhat rounded, and terminates superiorly in a triangular 'ear,' in which the hinge exists. The name 'pecten' (Latin for 'comb') is derived from the indentation of the edges and surfaces of the shell.

Pectinibranchiata (pek-tin-i-bran-ki-ā'ta), those gasteropods having pectinated branchiæ or gills, as the purple shells (*Murex*), whelk (*Bucoinum*), cowries (*Cypræa*), etc.

Pectolite (pek'tu-līt), a mineral consisting of a silicate of lime and soda. It is a tough grayish or whitish mineral occurring in trap-rocks, in aggregated crystals of a silky luster, arranged in sparlike or radiated forms. Called also *Stellite.*

Peculiar (pe-kūl'yar), in canon law, a particular parish or church which has jurisdiction within itself, and exemption from that of the ordinary or bishop's court. The *Court of Peculiars,* in England, is a branch of the Court of Arches which has jurisdiction over all the parishes in the province of Canterbury which are exempt from the ordinary jurisdiction, and subject to the metropolitan only.

Peculiar People, a small sect of English religionists whose special doctrine seems to be the efficiency of prayer without the use of any efforts on their own part. In sickness they reject the aid of physicians, accepting the exhortation of St. James v, 14, 15 in a strictly literal sense. They are called also *Plumstead Peculiars,* from the place of their origin.

Peculium (pe-kū'li-um), private property; specifically, in Roman law, that which was given by a father or master to his son, daughter, or slave, as his or her private property.

Pedagogy (ped'a-gō-ji), the science of teaching, or the systematic developing of the human faculties. Its ideal is to study the individual natures of youth, in order to train each in the special functions or talents with which he or she is endowed, so as to develop their minds in the most effective direction.

Pedals (ped'alz), parts of the mechanism of a musical instrument acted on by the feet. Pedals are used for different purposes in different instruments. In the organ they are used in two distinct ways: first, to act on the swell and stops when the instrument is played with the hands; second, to act upon a distinct set of pipes, called the

pedal organ, and which are played independently. On the pianoforte there was at first only one pedal, used to raise the dampers and prolong the sound after the fingers were lifted from the keys; a second was used to soften the notes, and is called the soft or una-corda pedal; a third has of late years been introduced, which arrests the sound immediately after the note is struck, and produces an artificial staccato. In the harmonium the pedals supply the instrument with wind.

Pedee (pē-dē'), GREAT and LITTLE, two rivers in the United States. The former rises in North Carolina, enters South Carolina, and falls into the Atlantic; total course, 360 miles, of which 200 miles are navigable for boats of 60 or 70 tons. Little Pedee rises in North Carolina, and enters the Great Pedee 32 miles above its embouchure.

Pedestal (ped'es-tal), an insulated basement or support for a column, a statue, or a vase. It usually consists of a base, a dado, and a cornice. When a range of columns is supported on a continuous pedestal the latter is called a *stylobate*.

Pedetes (pe-dē'tes; Gr. *pēdētēs*, a leaper), a genus of rodent mammals, of the mouse family, of which the best-known species is *P. capensis* (the jumping-hare of South Africa).

Pedicel (ped'i-sel), in botany, the stalk that supports one flower only when there are several on a peduncle. Any short and small footstalk, although it does not stand upon another footstalk, is likewise called a pedicel.

Pedicellariæ (ped-i-sil-ā'ri-a), certain minute organisms or structures found attached to the skin or outer surface of star-fishes, sea-urchins, and other Echinodermata. Each pedicellaria consists essentially of a stalk attached to the organism, and bearing at its free extremity two or more movable blades or jaws, which close and open on foreign particles so as to retain them. The exact nature of these structures is still a matter of doubt.

Pedic'ulus. See *Louse*.

Ped'igree. See *Genealogy*.

Pedilanthus (ped-i-lan'thus), a genus of South American plants belonging to the nat. order Euphorbiaceæ, of which one species (*P. tithymaloides*), used medicinally in the West Indies, is known under the name of ipecacuanha, and is employed for the same purpose as that drug.

Pediment (ped'i-ment), in classic architecture, the triangular mass resembling a gable, above the entablature at the end of buildings or over porticoes. The pediment is surrounded by a cornice, and is often ornamented with sculpture. The triangular finishings over doors and windows are also called pediments. In the debased Roman style the same name is given to these same parts, though not triangular in their form. In the architecture of the middle ages small gables and triangular decorations over openings, niches, etc., are called pediments.

Pedipalpi (ped'i-pal-pi), an order of arachnidans. It comprises the scorpions, together with certain other animals.

Pedometer (pe-dom'e-tėr) is an instrument like a watch, which serves to indicate the distance a pedestrian traveler has gone, or rather the number of paces he has made. See *Passometer*.

Pedro II, Emperor of Brazil, was born at Rio Janeiro in 1825; succeeded to the throne on the abdication of his father, Dom Pedro I, in 1831, and married the Princess Theresa Christina Maria (died 1890), sister of Francis I, king of Naples, in 1843. Brazil prospered greatly under the rule of Pedro II, who did much to develop its resources in every direction. In 1871 he issued an imperial decree for the gradual abolition of slavery, which totally ceased in Brazil in May, 1888. In 1889 a revolt of republicans took place and he was put on board ship and sent to Europe, the successful revolutionists establishing a republic. He spent the remainder of his life in Europe and died in 1891.

Peduncle (pe-dung'kl), in botany, the stem or stalk that supports the fructification of a plant, *i. e.*, the flower and the fruit.

Peebles (pē'blz), or TWEEDDALE, an inland county in Scotland, between Dumfries, Selkirk, Edinburgh, and Lanark; area, 356 square miles. The greater part of the surface consists of mountain, moor, and bog, and the main industry is sheep farming. Highest summit, Broad Law, 2723 feet, near the south border. White and red freestone are common in the northern part of the county, and both coal and limestone have been wrought at various points. The Tweed is the only river of any note. Pop. 15,066.— PEEBLES, capital of the above county, on the Tweed, is a favorite summer resort. The manufacture of tweeds and other woolen stuffs is carried on. Peebles was made a royal burgh in 1367. Pop. 3095.

Peechi. See *Dauw.*

Peekskill (pēks'kil), a village of Westchester Co., New York, picturesquely situated on the E. bank of the Hudson, 42 miles N. of New York City. Here is the Peekskill Military Academy. Manufactures include boilers, stoves, hollowware, bricks, hats, raincoats, underwear, oilcloth, etc. Pop. 15,868.

Peel (pēl), a seaport town and popular watering place on the west coast of the Isle of Man. It has important fisheries. On St. Patrick's Isle, joined to the mainland by a causeway, are the ruins of St. German's Cathedral and of Peel Castle. About 3 miles to the south-east is Tynwald Hill, celebrated in connection with the passing of the Manx laws. Pop. 3600.

Peel, SIR ROBERT, a British statesman, was born February 5, 1788, near Bury in Lancashire. His father, who had raised himself from a comparatively humble station to be the largest cotton manufacturer in the world, was created a baronet in 1800, and left behind him a fortune of nearly £2,000,000,

Sir Robert Peel.

of which the largest share was inherited by his eldest son, Robert. Young Peel was sent to Harrow and Oxford, where he took his bachelor's degree in 1808, with double first-class honors. Immediately on attaining his majority he was elected member of Parliament for Cashel; in 1810 he became under-secretary of state for the colonies, and in 1812-18 he was chief secretary for Ireland. In 1817 he was elected representative of the University of Oxford, and in 1830 succeeded his father as baronet. In the election of 1832 he was returned for Tamworth, for which he continued to sit during the remainder of his life. On the dismissal of the Whig government in 1834 Peel undertook the government, but his party in the house being in a minority the task was hopeless. After a brief struggle the ministry resigned, and were succeeded by the Whig ministry of Lord Melbourne, which lasted from 1835 to 1841. The general election of 1841 gave a large majority to Sir Robert Peel, and the formation of a Conservative ministry could no longer be delayed. In 1844 and 1845 he passed his celebrated English and Scotch Banking Acts. During the recess in 1845 the potato-rot and famine in Ireland brought the question of the corn-laws to a crisis, and Peel declared in favor of their total repeal. The act repealing the corn-laws (after a modified duty for three years) was passed June 26, 1846. On the same day the ministry was defeated in the House of Commons on the Irish Coercion Bill, and on the 29th of June Peel resigned the premiership. As leader of the opposition he supported many of the measures of the government of Lord John Russell, who succeeded him; but the policy of Lord Palmerston after the revolution crisis of 1848-49 evoked from him a more active hostility to the ministry. On June 29, 1850, he was thrown from his horse, and received injuries of which he died on July 2. By his will he renounced a peerage for his family, as he had before declined the Garter for himself.

Peele, GEORGE, one of the poets of Shakespeare's time, was born in Devonshire about 1558, and educated at Oxford, where he made a great reputation. Ultimately he settled at London as a theatrical writer, and was the associate of Nash, Marlowe and Greene. Of the many dramas of which he was reputed to be the author only a few are certainly known to be his, among these few being *The Chronicle History of Edward I.* He died in 1598.

Peele-Tower, or simply PEEL, the name given on the Scottish borders to small residential towers erected for defense against predatory excursions. They were usually square buildings with turrets at the angles. The lower part was vaulted, and served for the accommodation of horses and cattle.

Peep-o'-day Boys, the name given to those insurgents who appeared in Ireland in 1784, shortly after the volunteer movement. They were so named from visiting the

houses of the 'defenders,' their antagonists, at daybreak in search of arms.

Peepul (pē'pul), PIPUL, or SACRED FIG (*Ficus religiosa*), a species of fig-tree common in India, and held sacred by the Hindus and Buddhists. Its leaves are heart-shaped on long stalks. It attains a great age, and is usually planted near temples, where it affords shelter to the devotees. Vishnu is said to have been born under a peepul-tree. Its fruits are edible, but not much esteemed.

Peer (pēr; French, *pair*, from Latin *par*, equal), in general, signifies an equal, one of the same rank and station. In this sense it is used by the common law of England, which declares that every person is to be tried by his peers. Peer also signifies in Britain a member of one of the five degrees of nobility that constitute the *peerage* (duke, marquis, earl, viscount, baron), or more strictly a member of the House of Lords. The dignity and privileges of peers originated with the growth of the feudal system, the peers being originally the chief vassals holding fiefs directly from the crown, and having, in virtue of their position, the hereditary right of acting as royal counselors. Subsequently not all the crown vassals appeared at court as advisers of the king, but only those who were summoned to appear by writ. This custom grew at length into a rule, and these summonses were considered proofs of hereditary peerage. In later times the honor of the peerage has been exclusively conferred by patent. As regards their privileges all peers are on a perfect equality. The chief privileges are those of a seat in the House of Lords, of a trial by persons of noble birth in case of indictments for treason and felony, and misprision thereof, and of exemption from arrest in civil cases. The British peerage collectively consists of peers of England, of Scotland, of Great Britain, of Ireland, and of the United Kingdom, but only a portion of the Scotch and Irish peers are peers of Parliament.

Pegasus (peg'a-sus), in Greek mythology, a winged horse, the offspring of Poseidon and Medusa. Bellerophon made use of Pegasus in his fight with the Chimæra. (See *Bellerophon.*) With the stroke of his hoof Bellerophon called forth the sacred well Hippocrene, on Mount Helicon, from which he was in later times called the horse of the muses.

Peg'asus, a genus of acanthopterous fishes allied to the gurnets. *P. draco,* or sea-dragon, inhabits the Indian seas.

Pegmatite (peg'ma-tīt), a coarse granite rock, composed mainly of felspar and quartz, used in the manufacture of porcelain.

Pegu (pe'gŏ), now a division of Lower Burmah, but previous to 1757 a powerful and independent kingdom, and from that period up to 1853 a province of the Burmese Empire, from which it was severed and annexed to the British dominions in 1853. The province comprised the whole delta of the Irrawady; area, 25,964 square miles; pop. 2,323,512. The modern division of Pegu lies mainly on the east of the lower Irrawady; area, about 13,000 sq. miles; cultivated area, 2043 square miles; pop. 1,819,000. Chief town, Rangoon.

Pegu, an ancient city in the Pegu division of Lower Burmah, on the left bank of the Pegu River, about 70 miles north from Rangoon. Founded in the sixth century A.D., and long the capital of the kingdom of the same name, it was formerly a place of great size, strength, and importance, but was destroyed in 1757 by the Burmese. A new town has been built on the site of the old. Pop. (1911) 17,104.

Pehlvi, or PEHLEVI. See *Persia — Language.*

Pei-ho (pā-hō'), a river of Northern China, rises near the Great Wall, and flows southeast to the Gulf of Pechelee. It is navigable for boats to within 20 miles of Peking, which it passes at the distance of about 10 miles. At its mouth is the small town of Taku, with several forts, which acquired some note in the war with the British and French in 1860.

Peine Forte et Dure (pen fort e dür), a punishment formerly inflicted upon a prisoner who refused to plead guilty or not guilty when put on trial for felony. He was put into a low dark chamber, and laid on his back naked, on the floor. As great a weight of iron as he could bear was then laid upon him, and in this situation bread and water were alternately his daily diet till he died or answered.

Peipus (pe'i-pus), a lake on the eastern border of Esthonia, 30 miles S. of the Gulf of Finland, into which it is drained through the Narova. It is 55 miles long and 20 miles broad. It is well supplied with fish. Included in the Petrograd government.

Peishwa, or PESHWA (pesh'wa), the prime-minister and subsequently the head of the Mahratta Empire or Confederacy. See *Mahrattas.*

Pekan (pek'an, pē'kan), a species of marten (*Mustēla pennanti*)

nearly allied to the sable, found in woody regions of North America.

Pekin (pē'kin), a city, county seat of Tazewell Co., Illinois, on Illinois River, 10 miles s. of Peoria, on several railroads. There is coal in abundance. Industries include corn products refineries, saddlery, cereal and lumber mills, wagon and organ works. Pop. (1910) 9897; (1920) 12,086.

Peking (pē-king'), or PEKIN' ('northern capital' as opposed to Nanking), the capital of the Chinese republic, is in the province of Chih-le or Pechelee, on an extensive, barren, sandy plain, between the rivers Pei-ho and Hoen-ho, about 40 miles from the Great Wall, and 100 miles from the Gulf of Pechelee. The entire circuit of the walls and suburbs of Peking is reckoned at 30 miles. There are in all sixteen gates leading into the city, each protected by a semicircular enceinte, and a higher tower built in galleries. The city consists of two portions, the north or Tartar city, and the south or Chinese city. The former is built in the shape of a parallelogram, and consists of three inclosures, one within another, each surrounded by its own wall. The innermost inclosure ('the forbidden city') contains the imperial palace, and buildings connected with it, in which the emperor and royal family formerly resided. The second ('the imperial city') was the residence of the imperial princes and officials of the highest rank. The outer or Tartar city proper was the seat of the six supreme tribunals, and contains the legations of Great Britain, France, the United States and Russia. In the Chinese city broad straight streets run from gate to gate, intersecting each other at right angles, but they are unpaved, and in rainy weather impassable from mud. Among the principal public buildings of Peking are the Temple of Eternal Peace, belonging to the lamas; the Mohammedan mosque; the observatory; the Temple of Agriculture and the Temple of Heaven. In the latter temple the emperor periodically offered sacrifice. It is a vast circular building surmounted by a couple of inverted saucer-shaped roofs, one over the other, and the exterior is brilliantly and harmoniously colored. It occupies a commanding position, and is approached from the different sides by magnificent alabaster stairs. There are religious edifices appropriated to many forms of religion, the principle of toleration being here carried to the utmost extremity — among these are the Greek and Latin churches, Moslem mosques, Buddhist temples, besides temples dedicated to Confucius and other deified mortals. Among the institutions of Peking are the national college, the medical college, astronomical board, and the imperial observatory. Peking is sustained solely by its being the seat of government, having no trade except that which is produced by the wants of its population. Peking is regarded by the Chinese as one of their most ancient cities, but it was not made the capital of the country until its conquest by the Mongols about 1282. In the war of 1860 Peking was occupied by the British and French on October 12, and evacuated by them Nov. 5, after burning the summer palace and inflicting other damage. In 1900 it was the chief seat of the Boxer outbreak and attack on the foreign embassies, and was occupied by the international force sent to the relief of the diplomatic bodies. Considerable damage was done to the imperial city and palace, the court having fled. (See *China, History.*) Within recent years improvements are being made in the streets and means of travel in accordance with European ideas. Pop. (1912) 693,000.

Temple of Heaven, Peking.

Pelagianism (pe-lā'ji-an-izm), the system of opinions identified with the name of Pelagius (which see). They included a denial of original sin or the taint of Adam; the maintenance of the doctrine of free will and the merit of good works, and of the power in man to receive or reject the

gospel. The promulgation of his views by Pelagius was nearly simultaneous with that of the orthodox theory of original sin, etc., by Augustine, and in the development of his doctrine Augustine was influenced by his opposition to Pelagianism. Among the early supporters of Pelagius was Cœlestius, a Roman advocate, who afterwards became a monk; and it was the application of Cœlestius for ordination as a presbyter at Carthage which led to the open conflict between the two schools of thought. His application was denied on the ground of seven heretical opinions, and he was condemned and excommunicated by the Council of Carthage held in 412 A.D. In 417 and 418 A.D. the Council of Carthage repeated its condemnation, and the Emperor Honorius issued a rescript against the Pelagian doctrines. The pope then confirmed the sentence of the councils, and anathematized the Pelagians. In the East, Pelagianism was officially condemned by the Council of Ephesus in 431 A.D. A doctrine subsequently distinguished as *semi-pelagianism* was taught by John Cassian, a monk of Constantinople, ordained a deacon by Chrysostom in 403.

Pelagius (pe-lā'ji-us), the author of the system of doctrine which goes by his name (see above article), was understood by his contemporaries to be of British birth, and the name is supposed to be a Græcized form of the Cymric Morgan (sea-begotten). He was not a monk, but he adhered to monastic discipline, and distinguished himself by his sanctity and purity of life. He came to Rome in the beginning of the 5th century, and is there said to have learned the opinions afterwards identified with his name from a monk Ruffinus, whose teaching was founded on that of Origen. In 410 A.D., during Alaric's third siege of the city, he escaped with his convert and pupil, Cœlestius, to Northern Africa, and had gone from there to Palestine before the meeting of the Council of Carthage (411-12) which condemned Cœlestius. In Palestine he lived unmolested and revered until 415, when Orosius, a Spanish priest, came from Augustine to warn Jerome against him. The result was that he was prosecuted for heresy, but two councils (at Jerusalem, and at Diospolis, the ancient Lydda) pronounced him orthodox. He was subsequently expelled from Jerusalem, however, in consequence of condemnations by the Council of Carthage in 417 and 418 A.D., and by a synod held at Antioch in 421 A.D. Nothing is known of his subsequent career.

Pelamis (pel'a-mis), a genus of venomous sea-snakes, often found swimming in the ocean at great distances from land. It has a length of 2½ feet, and is black above and yellow beneath.

Pel'amys, a genus of fishes, belonging to the *Scombridæ*, or mackerel family. Five species are known.

Pelargonium. See *Geranium*.

Pelasgians (pe-las'ji-anz), a prehistoric race widely spread over the whole of Greece, the coasts and islands of the Ægean, and also in Asia Minor and Italy. Niebuhr regarded them as a great and widely-spread people, inhabiting all the countries from the Po to the Bosphorus, and supplying a common foundation to the Greek and Latin peoples and languages. Other writers, such as Grote, receive the entire tradition of the Pelasgians with almost complete scepticism.

Pelèe (pe-lā'), MONT, a volcano in the island of Martinique, West Indies, which broke into violent eruption with disastrous results, on May 8, 1902, after having been quiescent for half a century. St. Pierre, the principal city of the island, lay at the mountain's foot and its inhabitants, 30,000 in number, were overwhelmed and destroyed by an outflow of hot and smothering gases. The only one that escaped with life was a convict, who lay locked in an underground dungeon.

Peleus (pē'lūs), in Greek mythology, son of Æäcus, king of Ægina. After many adventures he became master of a part of Thessaly, and married the nymph Thetis, by whom he became the father of Achilles. The nuptials were celebrated on Mount Pelion, and honored with the presence of all the gods, who brought rich bridal presents. After his death he received divine honors.

Pelew Islands (pē-lō'), a group belonging to the Caroline Archipelago, in the North Pacific Ocean. They are about twenty in number, extend nearly N. N. E. and S. S. W. 87 miles, and are completely encircled by reefs. They are fertile, and enjoy a good climate. The inhabitants are Polynesians, and have generally got a high character from visitors. Pop. 3160.

Pelias (pē'li-as), a genus of serpents, including the common viper or adder (*P. berus*).

Pelican (pel'i-kan), the name of several web-footed birds of the genus *Pelecānus*. They are larger than the swan, have a great extent of wing, and are excellent swimmers. Pelicans are gregarious, and frequent the neigh-

borhood of rivers, lakes, and the seacoast, feeding chiefly on fish, which they capture with great adroitness. They have a large flattened bill, the upper mandible terminated by a strong hook, which curves over the tip of the lower one; beneath the lower mandible, which is composed of two flexible, bony branches meeting at the tip, a great pouch of naked skin is appended, capable of holding a considerable number of fish, and thus enabling the bird to dispose of the superfluous quantity which may be taken during fishing expeditions, either for its own consumption or for the nourishment of its young. The species are found in Europe, Asia, Africa, and America. They sometimes perch upon trees; the nest is of rough construction, usually placed close

Pelican (*Pelecanus onocrotalus*).

to the water. The common or white pelican (*P. onocrotalus*) is colored a delicate white, tinged with rose or pink. The young birds are fed by the parents with fishes from the pouch, and the males are said to feed the incubating females in a similar manner. The common pelican inhabits Europe, Asia and Africa. About the middle of September flocks repair to Egypt. During the summer months they take up their abode on the borders of the Black Sea and the shores of Greece. The pelican is not only susceptible of domestication, but may even be trained to fish for its master.

Pelion (pē'li-un), a mountain of Greece, in Thessaly, near the sea, 5300 feet high. In the war of the Titans with the gods the former, say the poets, piled Ossa upon Pelion to aid them in climbing to Olympus.

Pélissier (pā-lēs-yā'), JEAN JACQUES AMABLE, Duc de Malakoff, Marshal of France, was born in 1794; died in Algeria in 1864. He was educated at the school of St. Cyr, and in 1815 entered the army as sub-lieutenant of artillery, subsequently serving in Spain in 1823, in the Morea in 1828-29, and in Algeria. In this country, being now a colonel, in 1845 he suffocated in a cave a party of Arabs who had taken refuge in it, by lighting a fire at the mouth, an atrocity which brought great odium on his name. In 1855 he replaced Canrobert as commander-in-chief of the French army in the Crimea; and by the vigor

Marshal Pélissier.

with which he pushed the siege he justified the expectations which had been formed of him. On the capture of the Malakoff and the fall of Sebastopol Pélissier received his marshal's baton, and an annual pension of 100,000 francs. He was afterwards vice-president of the senate, a privy-councilor, and ambassador to England (1858). In 1860 he was appointed governor-general of Algeria.

Pella (pel'la), the ancient capital of Macedonia, and the birthplace of Alexander the Great. It surrendered to Paulus Æmilius 168 B.C., and from a large and magnificent city it sank, under the Romans, to a mere station.

Pellagra (pe-lā'gra, pel'a-gra), an endemic disease of comparatively modern origin occurring especially in the plains of North Italy It begins by an erysipelatous eruption on the skin, which breaks out in the spring, continues till the autumn, and disappears in the winter, chiefly affecting those parts of the surface which are habitually exposed to the sun or air, is accompanied or preceded by remarkable lassitude, melancholy, moroseness, hypochondriasis, and not seldom a strong propensity to suicide. With each year the disorder becomes more aggravated, with shorter intervals

in the winter. At length the surface becomes permanently enveloped in a thick, livid crust, death succeeding this condition. The disease is almost confined to those who reside in the country, leading an agricultural life, and to the lowest orders of society. The general opinion is that the pellagra results from the extreme poverty and low unwholesome diet of the peasantry. It has recently been maintained that the disease is due to the use of spoiled maize in making polenta, the common food of the Italian peasantry. The actual origin of the disease, however, is not yet fully established. It has recently made its appearance in the United States.

Pellew, EDWARD. See *Exmouth.*

Pellico (pel'i-kō), SILVIO, an Italian poet, born in 1788 at Saluzzo, in Piedmont. By his tragedies of *Laodamia* and *Francesca da Rimini* (represented in 1819, with great applause) he earned an honorable place among Italian poets. In the same year, with Manzoni and others, he established the periodical *Il Conciliatore.* In consequence of the liberal spirit displayed in his productions he was in 1820, along with several of his friends, arrested on the charge of belonging to the Carbonari, and in 1822 was condemned to death, but the sentence was commuted to imprisonment in the Austrian prison of the Spielberg for fifteen years. In 1830 he was set at liberty. Pellico has given a most interesting account of his ten years' sufferings in *Le Mie Prigioni* ('My Prisons'), which has been translated into many languages. His constitution, naturally feeble, had been completely shattered. The Marchioness of Barolo offered him an asylum at Turin, and he became her secretary. He died in 1854.

Pellitory (pel'i-tu-ri), or SPANISH CHAMOMILE (*Anacyclus Pyrethrum*), a plant nearly resembling chamomile, of the same order and belonging to an allied genus, a native of the Levant and of Southern Europe. It was introduced into England in 1750, and is chewed to relieve toothache and rheumatism of the gums. A genus of plants (*Parietaria*) of the nettle order is also known as pellitory, or wall-pellitory. The common wall-pellitory (*P. officinālis*) is a herbaceous perennial, with prostrate or erect branched stems, ovate leaves, and small flowers. It contains niter, and was formerly used as a diuretic.

Pelopidas (pe-lop'i-das), in ancient Greek history, a Theban general and statesman, who lived in intimate friendship with Epaminondas. The supremacy of the Spartan faction in Thebes forced Pelopidas, with other exiles, to take refuge in Athens, but he returned in B.C. 379, and succeeded in overthrowing the Spartan party and recovering the citadel of Thebes. In the war with Sparta which followed Pelopidas distinguished himself in the battles of Tegyra (375) and of Leuctra (371), by which Thebes became for a time the leading power of Greece. In 364 he was sent against Alexander of Pheræ, tyrant of Thessaly, whom he defeated in the battle of Cynoscephalæ, though he himself was slain.

Peloponnesus (pel-ō-pon-nē'sus; Gr. 'island of Pelops'), the peninsula which comprehends the most southern part of Greece, now called the Morea. Peloponnesus was anciently divided into six states: Messenia, Laconia (Sparta), Elis, Arcadia, Achaia, and Argolis, to which some add Sicyon. See *Greece* and articles on the different states.

Pelops (pē'lops), in Greek mythology, son of Tantalus, king of Lydia. He married Hippodamia, a daughter of King Œnomaus of Elis, and succeeded his father-in-law in that kingdom. Peloponnesus received its name from him. Of his sons, Atreus and Thyestes are most celebrated. Many and very different myths are connected with his name.

Peloria (pe-lō'ri-a; Gr. *pelōr,* a monster), in botany, the appearance of regularity of structure in the flowers of plants which normally bear irregular flowers, instances of which occur in the snapdragon and the toadflax, which, being normally irregular, assume a symmetrical form.

Peltier (pel-te-ā), JEAN CHARLES ATHANASE, French physicist; born in 1785; died in 1845. He was the author of numerous papers in different departments of physics, but his name is specially associated with the thermal effects at junctions in a voltaic circuit.

Pelusium (pē-lū'shi-um; the 'Sin' of the Scriptures), a city of ancient Egypt, situated on the eastern arm of the Nile delta, about 2½ miles from the sea, near the modern Damietta.

Pelvis (pel'vis; Latin, *pelvis,* a basin), the bony basin formed by the 'haunch-bones' and sacrum of Vertebrata, which constitutes the girdle or arch giving support to the lower or hinder limbs. The pelvis thus corresponds to the shoulder-girdle of the upper or fore limbs; and forms a cavity or basin in which several of the abdominal viscera, and organs relating to reproduction and the urinary functions, are protected and

contained. The pelvis consists of four bones, the front and sides being formed by the two *ossa innominata* or innominate bones, and the circle being completed behind by the *sacrum* and the *coccyx*. Each innominate bone consists in early life of three pieces termed *ilium*, *ischium*, and *pubis*, and they meet in front at the *symphysis pubis*. The pelvis of man differs materially from that of woman, the differences having chiefly reference to the greater capacity required for the womb during pregnancy, and for the expulsion of the child at birth. It also varies somewhat in the different races of men.

Pelvis.—*a*, Ilium; *b*, ischium; *c*, pubis; *d*, symphysis pubis; *e*, sacrum; *f*, coccyx; *g*, acetabulum or cavity for head of thigh-bone.

Pemberton (pem'bèr-tun), a town of England, Lancashire, 2½ miles w. of Wigan, with collieries, cotton-mills, chemical works, etc. Pop. (1911) 35,640.

Pembrey (pem'bri), a seaport of South Wales, in Carmarthenshire, on the Burry Inlet, 5 miles w. of Llanelly. It has tin and copper works, and ships considerable quantities of coal. Pop. (1911) 12,183.

Pembroke (pem'brōk), a seaport of South Wales, capital of the county of the same name, on a creek on the southern side of Milford Haven, 206 miles west of London. On the west side are the picturesque ruins of an ancient castle or fortress erected in 1092, the remains of which give evidence of its former magnificence. On the northwest side is Pembroke Dock, otherwise called Pater, a small village until 1814, when the royal dockyard for the construction of ships of war was removed thither from Milford Haven. The town has now but little trade beyond that connected with the government dockyard, which comprises an area of about 80 acres, and is strongly fortified. Pop. (1911) 15,673.—The COUNTY is bounded by the Cardiganshire, Carmarthenshire, the Bristol Channel, and St. George's Channel; area, 628 sq. miles. Its coast-line is deeply indented, and in the south is the magnificent harbor of Milford Haven. The surface is generally undulating, and greatly diversified with hills and dales. Lead, iron, slate, and coal are worked. The climate is humid and very mild. Chief towns: Haverfordwest, Pembroke and Tenby. Pop. 89,956.

Pembroke, a town, seat of Renfrew Co., on Allumette Lake, Ontario, Canada. It is the centre of a lumbering industry and has sawmills, woolen and other industries. Pop. (1911) 5626.

Pemmican (pem'i-kan), originally a North American Indian preparation consisting of the lean portions of venison dried by the sun or wind, and then pounded into a paste and tightly pressed into cakes. Pemmican made of beef is frequently used by travelers.

Pen, an instrument for writing with a fluid. Pens of some sort have been in use from very early times, adapted to the material on which the characters were to be inscribed. The metallic stilus for the production of incised letters was probably the earliest writing implement. It was used by the Romans for writing on tablets coated with wax; but both they and the Greeks also used what is the true ancient representative of the modern pen, namely, a hollow reed, as is yet common in Eastern countries. It has been asserted that quills were used for writing as early as the fifth century A.D. In Europe they were long the only writing implement, the sorts generally used being those of the goose and swan. Up till the end of the first quarter of the 19th century these formed the principal materials from which pens were made. In 1803 Mr. Wise produced steel pens of a barrel form, mounted in a bone case for carrying in the pocket. They were of indifferent make, and being expensive (costing half-a-crown each originally, though the price was subsequently reduced to sixpence), were very little used. Joseph Gillott commenced the manufacture about 1820, and succeeded in making the pen of thinner and more elastic steel, giving it a higher temper and finish. Mr. Gillott was followed into the same field by Mr. Perry and others, and their improvements have so reduced the cost and raised the quality, that a gross of better pens are now sold by the same makers at one-sixth of the price of a single pen in 1821. Cast-steel of the finest quality is used in the manufacture, and the various operations are performed by cutting, stamping, and embossing apparatus worked mostly by hand-fly presses. Birmingham was the first home and is still the principal center of the steel-pen industry, though the manufacture has spread to the United States and other countries. Gold pens tipped

with minute particles of iridium are now in somewhat extensive use, and a good one will last for years. Fountain pens and penholders, to carry a considerable supply of ink and to discharge it in an equal manner, were invented by Joseph Bramah and have been frequently and greatly improved upon. They are now in somewhat common use. Gold pens are usually employed in them.

Penance (pen'ans), in theology, a punishment accepted or self-imposed by way of satisfaction and in token of sorrow for sin. In the early Christian church penances were of three kinds — secret, public, and solemn. The first consisted of such actions as are commonly imposed by confessors at the present day, as the repetition of certain prayers, etc. Public penance was in use from the earliest days of the church. It was often very severe, and the penitents had to make a public confession of their sins in the church. It became gradually the custom of the bishops to commute the canonical penances for pious works, such as pilgrimages, alms-deeds, and other works of charity; and these again were exchanged ror indulgences. In the Roman Catholic Church penance is one of the seven sacraments. The matter of it consists of the three acts of the penitent: 1. Contrition, or heartfelt sorrow for sin as being an offense against God; 2. Confession to an authorized priest, and 3. Satisfaction, or the acceptance and performance of certain penitential works in atonement of the sin; and the form of the sacrament is the sentence of absolution from sin pronounced by the priest who received the confession, and has been satisfied of the earnest repentance of the sinner. According to the doctrine of the Protestants there is no such sacrament; they consider repentance and faith as the only requisites for forgiveness.

Penang (pē-nang'), PULO-PENANG, or PRINCE OF WALES ISLAND, an island belonging to Great Britain, lying at the north entrance of the Straits of Malacca, off the west coast of the Malay Peninsula, from which it is separated by a channel 2 to 5 miles across; area, 107 sq. miles. Two-fifths of Penang is plain, and the rest hills — for the most part wooded — which rise to a height of 2734 feet in the peak now used as a sanatorium. The climate is hot, but very healthy. The scenery is charming. The island produces cocoa-nuts and areca-nuts, nutmegs and cloves, rice, sugar, coffee, and pepper. George Town, or Penang (pop. about 50,000), the capital and port of the settlement, is a handsome town, rapidly increasing in size, and has a large commerce. The harbor is the strait between island and mainland. Penang was made over by treaty to the East India Company in 1786 by the Rajah of Quedah, and with Province Wellesley, a long strip of the Malay Peninsula opposite (area, 270 square miles), it now forms one of the Straits Settlements, having a resident councilor to control administration. Pop. of the settlement 248,207.

Penarth (pen-ärth'), a seaport of South Wales, in Glamorgan, at the mouth of the river Taff, 3 miles south of Cardiff. Penarth was an obscure village until the formation of its docks (1865-84), which have made it an important shipping port for the minerals of South Wales. It is frequented in summer as a bathing-place and seaside resort. Pop. (1911) 15,488.

Penates (pe-nā'tēz), the private or public gods of the Romans. The images of these gods were kept in the penetralia, or central part of every house, each family having its own Penates and the state its public Penates. The Lares were included among the Penates, but were not the only Penates; for each family had generally but one Lar, whereas the Penates are usually spoken of in the plural. Their worship was closely connected with that of Vesta.

Pencil (pen'sil), an instrument used for painting, drawing, and writing. The first pencils used by artists were probably pieces of colored earth or chalk cut into a form convenient for holding in the hand. On the introduction of moist colors, however, delicate brushes of fine hairs were used. Pencils of this kind, and of various degrees of fineness, are now almost solely used by painters for laying on their colors; and in China and Japan they are generally employed, instead of pens, for writing. The hairs used for these pencils are obtained from the camel, badger, squirrel, sable, goat, etc. The hairs, being selected, are bound in a little roll by a string tied tightly round their root ends. The roll is then fixed into the end of a quill tube. For larger pencils a socket of tin-plate is used instead of the quill. Black-lead pencils, for writing or drawing, are made of slips of graphite or plumbago (otherwise known as black-lead), generally cased in cedar wood. Blocks of graphite are rarely found of such size and purity that they can be sawed up into the small square slices of ordinary pencil length; but a method has been devised of purifying the inferior varieties, which are ground to a fine powder, levigated or

washed until pure, intimately mixed with clay in various proportions, and afterwards solidified by pressure. The comparative hardness and blackness of pencils are attained by the degree of heat to which they are subjected and the proportions of graphite and clay in the leads. Nuremberg is the great center of the lead-pencil trade. Colored pencils are prepared from various chalks, such as are used for crayons, instead of the graphite. Pencils for writing on slate are made by cutting slate into small square pieces and rounding them, or into narrow slips and incasing them in wood.

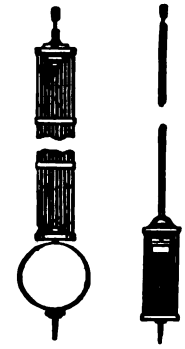
Pendant, in architecture, is a hanging ornament used in the vaults and timber roofs of Gothic buildings, more particularly in late Gothic work. In vaulted roofs pendants are of stone, and generally richly carved; in timber roofs they are of wood variously decorated. Fine examples of stone pendants are to be seen in the chapel of Henry VII at Westminster Abbey. See *Pennant.*

Pendentive (pen-den'tiv), in architecture, the portion of a dome-shaped vault which descends into a corner of a quadrangular opening when a ceiling of this kind is placed over a straight-sided area; in Gothic architecture, the portion of a groined ceiling springing from one pillar or impost, and bounded by the ridges or apices of the longitudinal and transverse vaults.

Pendleton (pen'dl-ton), a city, county seat of Umatilla Co., Oregon, on Umatilla River, 195 miles E. of Portland. Its industries comprise flour and woolen mills, the manufacture of Indian robes, sheep raising and wool production, the cattle business and other livestock, alfalfa production, etc. Here is staged annually the famous Pendleton Round-up and Happy Canyon, the greatest exhibition of its kind. Pop. 7387.

Pendleton, GEORGE HUNT (1825-89), an American legislator and diplomatist, born in Cincinnati, Ohio. He was a leader of the Greenback party. In 1885 President Cleveland appointed him Minister to Germany. While in the U. S. Senate (1879-85) he introduced the Pendleton Civil Service Reform Bill. He died at Brussels, Nov. 24, 1889.

Pendulum (pen'dū-lum), in the widest sense, a heavy body suspended so that it is free to turn or swing upon an axis which does not pass through its center of gravity. Its only position of stable equilibrium is that in which its center of gravity is in the same vertical plane with the axis. If the body is displaced from its position it will tend to return to it, and it will oscillate or swing from one side of that position to the other until its energy is destroyed by friction, and it at length comes to rest. A small, heavy body suspended from a fixed point by a string, and caused to vibrate without much friction, is called a 'simple pendulum.' When the swings of a simple pendulum are not too great — that is, when they are never more than about 3° on outside of the position of rest — the pendulum is isochronous, that is, each swing occupies the same time, and its period is true to the law—



Gridiron Pendulum. Mercurial Pendulum.

$$T=2\pi\sqrt{\frac{l}{g}};$$

where T is the period of a complete vibration, π is the well-known mathematical number 3.1416, l the length of the pendulum in feet, and g the acceleration due to gravity, or 32.19 feet per second at London. The 'seconds' pendulum has for its time of vibration (half its complete period) one second. In the above equation, putting for T two seconds, and for g 32.19, we find the length of the seconds pendulum at London to be 3.26 feet, or 39.1398 inches. A true simple pendulum is a mathematical abstraction: a heavy particle, an inextensible and inflexible weightless string, and no friction; these conditions are only approximated to in nature. The ordinary pendulum is what is properly a 'compound pendulum.' A compound pendulum, as seen in clocks, is usually a rigid, heavy, pendulous body, varying in size according to the size of the clock, but the 'seconds' pendulum may be considered the standard. The pendulum is connected with the clockwork by means of the escapement, and is what renders the going of the clock uniform. (See *Clock.*) In a clock it is necessary that the period of vibration of the pendulum should be constant. As all substances expand and contract with heat and cold, the distance from the center of suspension to the center of gravity of a pendulum is continually altering. Pendulums constructed so that increase or dim-

inution of temperature do not affect this ratio are called compensation pendulums. These take particular names, according to their forms and materials, as the *gridiron pendulum*, the *mercurial pendulum*, etc. The former is composed of a number of rods so connected that the expansion or contraction of certain of them is counteracted by that of the others. The *mercurial pendulum* consists of one rod with a vessel containing mercury at the lower end, so adjusted in quantity that whatever alterations take place in the length of the pendulum, the center of oscillation remains the same, the mercury ascending when the rod descends, and *vice versâ*.

Penedo (pā-nā'dụ), a town of Brazil, in the province of Alagoas, near the mouth of the San Francisco River. Pop. about 12,000.

Penelope (pen-el'u-pē), in Greek mythology, the wife of Odysseus (Ulysses) and mother of Telemachus, who was but an infant when his father sailed against Troy. During the protracted absence of Odysseus, Penelope was surrounded by a host of suitors, whom she put off on the pretext that before she could make up her mind she must first finish a large robe which she was weaving for her father-in-law, Laërtes. To gain time she undid by night the work she had done by day. Her stratagem was at last communicated to the suitors by her servants, and her position became more difficult than before; but fortunately Odysseus returned in time to protect his spouse, and slay the obnoxious wooers, who had been living in riot and wasting his property.

Penelope, a genus of gallinaceous birds. See *Guan*.

Penguin (pen'gwin), a family of natatorial or swimming birds adapted for living almost entirely in the water. They possess only rudimentary wings, destitute of quill-feathers, and covered with a scaly integument or skin. Although useless as organs of flight, the wings are very effective aids in diving, and on land they may be used after the fashion of fore-limbs. The legs are placed at the hinder extremity of the body, and the birds assume an erect attitude when on land. The toes are completely webbed. They inhabit chiefly the high southern latitudes, congregating sometimes in colonies of from 30,000 to 40,000. There are three different types of penguins, represented by the king penguin, the jackass penguin, and the rockhopper, constituting respectively the generic groups *Aptenodytes*, *Spheniscus*, and *Catarractes*. The jackass penguin and the rockhopper are about 2 ft. 3 in. in height; the king somewhat larger.

Penguins

Penicillium (pen-i-sil'i-um), a genus of fungous plants found on decaying bodies and in fluids in a state of acetification. *P. glaucum* is the ultimate state both of the vinegar-plant and the yeast-plant, called in its first stage *Torula cerevisiæ*.

Peninsula (pen-in'sū-la; L. *pene*, almost, and *insula*, an island), a portion of land almost surrounded by water, and connected with the mainland by a narrow neck or isthmus. The term 'The Peninsula' is frequently applied to Spain and Portugal conjointly.

Peninsular War, The, was caused by the intrigues and ambition of Napoleon, who proposed the partition of Portugal (1807), and placed his brother Joseph upon the throne of Spain. For a time the whole peninsula was occupied by French troops, but the Spanish and Portuguese peoples rose in defense of their liberties, and waged a fierce guerrilla warfare against the invaders. Britain joined the patriots in 1808. Of the memorable struggle which ensued, the main features were the retreat of Sir John Moore to Coruña, and his glorious death there; the accession of Sir Arthur Wellesley (afterwards Duke of Wellington) to the supreme command; his formation of the celebrated lines of Torres Vedras, where he held the French armies in check until he had accomplished the complete liberation of Portugal; and his subsequent victorious march through Spain, marked by the great battles of Salamanca (1812) and Vittoria (1813). In the spring of 1814 the tide of war rolled through the passes of the Pyre-

nees into the south of France, where this great struggle was concluded by the crowning victory of Toulouse.

Penistone (pen'is-ton), a town of Yorkshire, England, 12 miles N.W. of Sheffield, with steel and other industries. Pop. (1911) 7408.

Penitential Psalms (pen-i-ten'-shal), the seven psalms vi, xxxii, xxxviii, li, cii, cxxx, cxliii of the Authorized Version, so termed as being specially expressive of contrition. Reference is made to them by Origen. They have a special place in the breviary of the Roman Church. The psalm most frequently repeated as being the most penitential is the Miserere, the li. of the Authorized Version.

Penitentiary (pen-i-ten'sha-ri), a prison in which convicted offenders are confined and subjected to a course of discipline and instruction with a view to their reformation. The two systems of penitentiaries in the United States are known as the Pennsylvania, or solitary confinement system, and the New York, or aggregate labor system.

Penitentiary, at the court of Rome, an office in which are examined and delivered out the secret bulls, graces, or dispensations relating to cases of conscience, confession, etc.; also an officer in some Roman Catholic cathedrals, vested with power from the bishop to absolve in cases referred to him. The pope has a grand penitentiary, who is a cardinal and is chief of the other penitentiaries.

Penn, WILLIAM, the founder of the State of Pennsylvania, was born in London in 1644. He was the only son of Admiral Sir William Penn. In his fifteenth year he was entered as a gentleman commoner of Christ Church, Oxford, where he imbibed the views of the Society of Friends and was expelled from the university. His father sent him on travels in France and Holland, and in 1666 committed to him the management of a considerable estate in Ireland. At Cork he was committed to prison for attending Quaker meetings, and although he was very soon liberated, he had to leave Ireland. In 1668 Penn appeared as a preacher and an author, and on account of an essay, entitled *The Sandy Foundation Shaken*, he was imprisoned in the Tower, where he remained seven months. During this time he wrote his most celebrated work, *No Cross, no Crown, and Innocency with Her Open Face.* In 1670 Sir William died, fully reconciled to his son, to whom he left his estates and all his property. This same year meetings of Dissenters were forbidden, under severe penalties. The Quakers, however, continued to meet as usual, and Penn was once more put into prison for six months. The persecutions of Dissenters continuing to rage, Penn turned his thoughts towards the New World. From his father he had inherited a claim upon the government of £16,000, and in settlement of this claim King Charles II, in 1681, granted him large territories on the west side of the Delaware River, the present State of Pennsylvania, with right to found a colony or society with such laws and institutions as expressed his views and principles. The following year Penn went over to America and laid the foundations of his colony on a democratical basis, and with a greater degree of religious liberty than had at that time been allowed in the world. The city of Philadelphia was laid out upon the banks of the Delaware, and the colony soon came into a flourishing condition, its settlers including not only Friends, or Quakers, but immigrants of different denominations and countries. He remained in the province about two years, adjusting its concerns, and establishing a friendly intercourse with his colonial neighbors. Soon after Penn returned to England King Charles died (1685), and the respect which James II bore to the late admiral, who had recommended his son to his favor, procured to him free access at court. His influence with the king had its effect in producing the release of the 1200 Quakers then in prison, and probably in the issue of a general pardon and the repeal of religious tests and penalties. After the revolution of 1688 his former intimacy with James II led to a charge of disloyalty and trials for conspiracy and treason. While he was acquitted, he was for a time deprived of his American province. He returned to Pennsylvania in 1699, remaining until 1701. But the ill management of his agents brought him into debt and his refusal to pay unjust claims led to his imprisonment, his friends finally compromising with his extortionate creditor. He died July 30, 1718.

Pennant, or PENDANT, a long, narrow banner displayed from the mast-head of a ship-of-war, usually terminating in two ends or points, called the *swallow's tail.* It denotes that the vessel is in actual service.

Pennant (pen'ant), BASEBALL, is the trophy contended for by the clubs in the various baseball leagues. It is of silk and is purchased out of the league's funds and presented to the club

winning the most games of the season in that league.

Pennant, THOMAS, an English naturalist and antiquary, born at Downing, in Flintshire, in 1726. He early devoted himself to natural history and archæology. In 1761 he published the first part of his *British Zoölogy*, which gained him considerable reputation both in Britain and on the Continent. In 1765 he made a journey to the Continent, where he visited Buffon, Haller, Pallas, and other eminent foreigners. He was admitted into the Royal Society in 1767, and in 1769 he undertook his first tour into Scotland, where he met with a flattering reception. After a busy life of literary labor and research he took leave of the public in 1793 in an amusing piece of autobiography — *The Literary Life of the late Thomas Pennant.* He died in 1798.

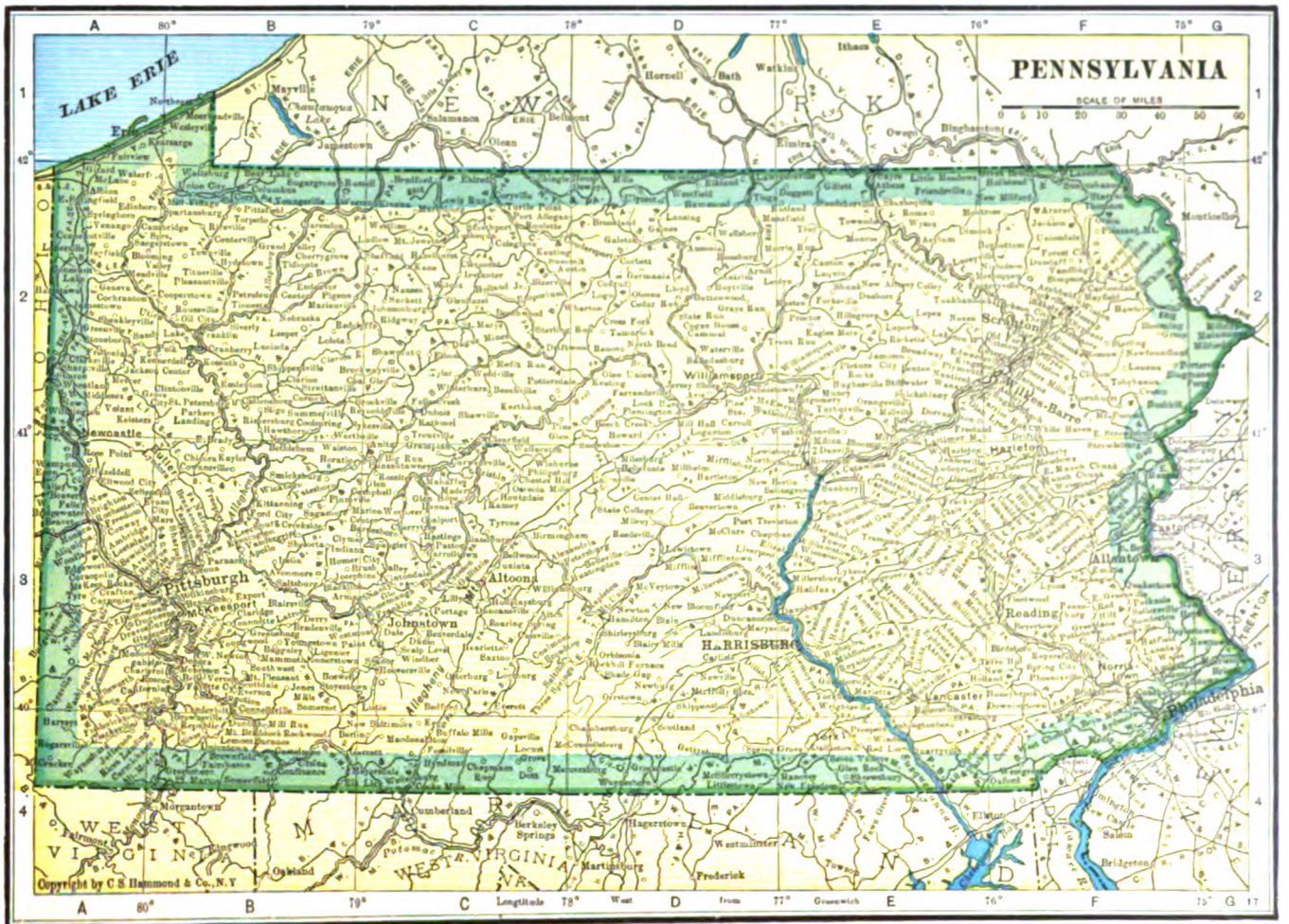
Pennatula (pen-at'ū-la), a genus of Cœlenterate animals (popularly known by the name of 'sea-pens' or 'cocks'-combs'); belonging to the class Actinozoa, order Alcyonaria. The sea-pens consist each of a compound organism, which may be described as consisting of a main stem or *cœnosarc*, with lateral pinnæ or branches. These branches are crowded on their upper margins with the little polyps or individual animals that make up the compound mass, and which are connected together through the fleshy medium or cœnosarc. The lower end of the stem is fleshy, destitute of polyps, and contains an internal coral-rod. By this fleshy root the sea-pens attach themselves loosely to the mud of the sea-bed. The British species (*P. phosphorĕa*), averaging about 3 or 4 inches in length, derives its scientific name from its property of emitting a phosphorescent light.

Pennatula (*P. rubra*).

Pennell (pen'el), JOSEPH, American etcher, illustrator and author, born in Philadelphia in 1860. In 1884 he married Elizabeth Robins, who has been his literary collaborator in the preparation of numerous illustrated books of travel and description.

Pennsgrove (penz'grove), a borough and resort of Salem Co., New Jersey, on Delaware River, opposite Wilmington. It has powder plants, etc. The fishing industry is of importance. Pop. (1920) 6060.

Pennsylvania (pen-sil-vā'ni-a), one of the North Atlantic States of the American Union, bounded N. by New York and Lake Erie, E. by New York and New Jersey, S. by Delaware, Maryland, and West Virginia, and W. by West Virginia and Ohio; area 45,126 sq. miles. Except on the east, where the river Delaware forms an irregular boundary line, its sides form an almost exact parallelogram facing the cardinal points. The surface is traversed southwest to northeast by the Allegheny mountain chain, and covered by many smaller ranges, which are more or less parallel to it. These include the Blue Ridge, or South Mountain, on the east, the Allegheny ridges on the west, and various intermediate ones, while between them lie the large and fertile Cumberland, Lebanon, and Wyoming valleys. On the east side the Alleghenies are rugged and steep, but on the west descend very gradually, and then stretch out into an extensive table-land. The principal rivers are the Delaware, which receives the Lehigh and the Schuylkill; the Susquehanna, with its main tributary, the Juniata; and the Allegheny, which unites at Pittsburgh with the Monongahela to form the Ohio. Pennsylvania is one of the healthiest states of the Union. The soil has various grades of fertility, but is in general well adapted for agricultural operations. The richest and most highly cultivated tract is southeast of the mountains on both banks of the Susquehanna, including the Lancaster and Chester valley regions; also the valleys of the Ohio and its tributaries. The most important crops consist of oats, corn, wheat, rye, buckwheat, and potatoes, while tobacco is abundantly raised in the Lancaster valley region. Dairy and market garden products are also large and valuable. Nearly one-fourth of the state is covered by woodland and the lumber interests are extensive. In mineral wealth Pennsylvania has long ranked high, especially in coal, iron, and petroleum. In the mountain districts of the north and east to the west of the Susquehanna an anthracite coal-field of unrivaled value occurs over an area estimated at 472 square miles; while to the west of the Alleghenies a vast bituminous coal-field, of which Pittsburgh may be considered the center, has been traced over an area of 12,300 square miles.


PENNSYLVANIA
SCALE OF MILES
0 5 10 20 30 40 50 60
LAKE ERIE
NEW YORK
OHIO
MARYLAND
WEST VIRGINIA
Pittsburgh
Johnstown
Altoona
HARRISBURG
Williamsport
Scranton
Hazleton
Allentown
Reading
Lancaster
Philadelphia
Newcastle
Erie
Jamestown
Mayville
Salamanca
Olean
Hornell
Bath
Watkins
Ithaca
Elmira
Owego
Binghamton
Montiello
Morgantown
Cumberland
Berkeley Springs
Hagerstown
Martinsburg
Westminster
Frederick
Oakland
Ellton
Salem
Bridgeton
Norris Town
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Longitude West from Greenwich

The coal strata of both these fields contain many valuable seams of ironstone, and both the smelting and working of iron have long been regarded as the most important interest of the state. An accession of immense value was the discovery of petroleum in 1859. Pennsylvania surpasses all other states in the value of its mineral products, while in the production of coal, it still stands preeminent, the state producing about one-third the coal of the entire country. Other mineral products are pig iron, cement rock, copper, feldspar, flint, glass, sand, graphite, etc. There are a number of noted mineral springs. In the amount of its manufactures the state is second only to New York. The city of Philadelphia is one of the world's great manufacturing centers, Pittsburgh is unsurpassed in the country for its iron and glass interests, and several other cities are prominent in iron and steel products. In machine-shop products Pennsylvania takes first rank, as also in textile and carpet manufactures and shipyard products. Its trade is also large, both foreign and inland. In railroad facilities it stands third, with 11,290 miles, being surpassed only by Texas and Illinois. Its canals, formerly over 1000 miles in length, have been largely abandoned in consequence of railroad rivalry. Education is well advanced, the higher institutions of learning including the University of Pennsylvania, State College, University of Pittsburgh, Bryn Mawr College, Lafayette College, Lehigh University, and other prominent institutions. The first settlement in the state was made by a company of Swedish emigrants in 1638. The Dutch afterwards gained possession, but it was wrested from them by the English in 1664. A subsequent settlement was made in 1682 by William Penn. The capital is Harrisburg; largest city, Philadelphia. Pop. (1900) 6,302,115; (1910) 7,665,111; (1920) 8,720,017.

Pennsylvania, UNIVERSITY OF, an institution for higher learning, in Philadelphia, Pa., founded in 1740 as a charity school, reorganized as an academy, again as a college, and in 1791 as the University of Pennsylvania. It comprises a college, including the School of Arts and the College Course for Teachers; the Towne Scientific School, the Wharton School of Finance and Commerce, the School of Education, the Graduate School, and schools of law, medicine, dentistry, veterinary medicine, etc. Students (1920-21) 11,182.

Pennsylvania Dutch, a German dialect mixed with English, spoken in Pennsylvania by German settlers and their descendants.

Pennsylvania State College, a State coeducational institution, at State College, Pa., near Bellefonte, opened in 1859. It has schools of Liberal Arts, Agriculture, Engineering, Natural Science, etc. Students (1920) 2936.

Penny (pen'i), a British coin (formerly of copper, since 1860 of bronze) and money of account, the 12th part of a shilling, equal to two cents in American money. The American cent is referred to locally as a 'penny.'

Penn Yan (pen yan), a village, county seat of Yates Co. New York, picturesquely situated on Lake Keuka, 45 miles S. E. of Rochester. It is the home of Penn Yan Academy. Has fruit and farm interests. Pop. 5215.

Pennyroyal (pen'i-roi-al), a species of mint (*Mentha Pulegium*) formerly in considerable repute as a medicine, but now almost totally neglected. See *Mint*.

Penobscot (pe-nob'skot), the largest river of Maine. It flows 300 miles S. by W. to Penobscot Bay.

Penobscot Indians, a tribe of Indians living in American colonial times in what is now the state of Maine. In language they were Algonkin and at one time were part of the Abnaki confederacy. Most of the Penobscot Indians now living are in Oldtown, Maine.

Penology (pē-nol'o-gi), the name applied to penitentiary science, being that department of sociology concerned with the processes devised and adopted for the repression and prevention of crime. The study of penology has attracted wide attention within recent years, and much has been done through legislation and awakened public sentiment to improve penal systems generally.

Penrith (pen'rith), a market-town of England, in the county of Cumberland, 17 miles south by east of Carlisle. Pop. (1911) 8612.

Pensacola (pen-sa-kō'la), a port of entry and county seat of Escambia county, Florida, on Pensacola Bay, about 10 miles from the Gulf of Mexico, and 50 miles (direct) S. E. of Mobile. It has a deep harbor and the bay is one of the safest and most capacious in the Gulf of Mexico. It has been selected as a naval station and depot, the navy yard being at Warrington, 7 miles to seaward of the town. The entrance to the harbor is defended by several strong forts. There are here large grain elevators, and the place has an extensive shipping trade in lumber, fish,

hides, wool, cotton, and naval stores. Pop. (1910) 22,982; (1920) 31,035.

Pensionary (pen'shun-a-ri), one of the chief magistrates of towns in Holland. The *Grand Pensionary* was the first minister of the United Provinces of Holland under the old republican government.

Pensions (pen'shunz), annual allowances of money settled upon persons, usually for services previously rendered. In Britain civil pensions are conferred on certain ministers of state, etc., on retirement after a number of years' service, with smaller sums called the civil list pensions. These latter pensions are assigned to those who, by their personal services to the crown, by the performance of duties to the public, or by their useful discoveries in science and attainments in literature and the arts, have merited the gratitude of their country. In addition, army and navy pensions are paid to veterans of those incapacitated for service by wounds, etc. By a law which became effective January 1, 1909, a system of old-age pensions was established in Britain. A similar system had existed in Germany for many years, and like ones have been established to a partial extent in some other countries. In the United States the pension system differs from that of most other countries; pensions, with few exceptions, are granted only on account of military service; having no large standing army, its pensions are given chiefly to volunteers and drafted men. Since the Civil war the pension system has developed from a very small establishment to a great bureau. The appropriations made by Congress have increased yearly. In 1861 there was disbursed on account of pensions $1,072,461. There were 820,200 pensioners on the rolls June 30, 1913, the disbursement for pensions amounting to $174,171,670. While the system of old age pensions has not been introduced into the United States as a government institution, it has been established in some of the states and cities, for teachers, policemen, and firemen, and by a number of railroad and other corporations. The government is considering a general service pension system.

Pensions, Mothers'. In connection with country-wide discussion of the education of the child have come within recent years many definite steps for preserving to the child the benefits gained only from proper home influences. In the belief that separation of mother and child necessarily works to the detriment of the child's development, many states have enacted legislation that will enable mothers too poor to maintain their children, to keep them at home instead of placing them in various institutions. This is being done through a pension or allowance system. Many state legislatures have passed these pension laws, and a number of cities have provided similar aid by municipal ordinances.

Pentagon (pen'ta-gon), a figure of five sides and five angles; if the sides and angles be equal it is a regular pentagon; otherwise, irregular.

Pentagraph. See *Pantograph.*

Pentamera (pen-tam'ē-ra), one of the primary sections into which coleopterous insects (beetles) are divided, including those which have five joints on the tarsus of each leg.

Pentamerone (pen-ta-mē-rō'nā), a famous collection of fifty folk-tales (Naples, 1637), written by Giambattista Basile in the Neapolitan dialect. They are claimed to be told during five days by ten old women for the entertainment of a Moorish slave, who has usurped the place of the rightful princess. They have been translated into German and English, a complete English translation being published by Sir Richard Burton in 1893. These tales are of great value to the student of folk-lore.

Pentameter (pen-tam'e-tẽr), in prosody, a verse consisting of five feet. It belongs more especially to Greek and Latin poetry. The first two feet may be either dactyls or spondees, the third is always a spondee, and the last two anapests. A pentameter verse, subjoined to a hexameter, constitutes what is called the elegiac measure.

Pentateuch (pen'ta-tūk), the Greek name applied to the first

five books in the Bible, called also the Law of Moses (Hebrew, *Torah Moshch*), or simply the Law (*Torah*). The division of the whole work into five parts has by some authorities been supposed to be original; others, with more probability, think it was so divided by the Greek translators, the titles of the several books being Greek, not Hebrew. It begins with an account of creation and the primeval condition of man; of the entrance of sin into the world, and God's dealing with it, broadening out into a history of the early world, but again narrowing into biographies of the founders of the Jewish family; it then proceeds to describe how the family grew into a nation in Egypt, tells us of its oppression and deliverance; of its forty years' wandering in the wilderness; of the giving of the law, with all its civil and religious enactments; of the construction of the tabernacle; of the census of the people; of the rights and duties of the priesthood; and concludes with the last discourses of Moses and his death. The Pentateuch and the book of Joshua are sometimes spoken of together as the *Hexateuch*; when Judges and Ruth are added, as the *Octateuch*.

Until nearly the end of the 18th century the conviction that Moses wrote the complete work, with the exception of the last chapter or so of Deuteronomy, ascribed to Joshua, might be said to have been universally adhered to; but previously to this the question whether the Pentateuch was the work of one man or of one age, and what share Moses had in its composition, had been discussed seriously and with more or less critical investigation. Spinoza, in a work published in 1679, maintained that we owe the present form of the work to Ezra. A scientific basis was given to the investigation by Jean Astruc (1753), who recognized two main documentary sources in Genesis, one of which used the name *Elohim* and the other *Jehovah* for God. This 'documentary theory' gave way to the 'fragmentary theory' of Vater (1815) and Hartmann (1818), who maintained that the Pentateuch was merely a collection of fragments thrown together without order or design. This theory has now lost its popularity by the substitution of another, called the 'supplementary hypothesis,' whose leading principle is that there was only one original or fundamental document (the Elohistic) giving a connected history from first to last, such as we have in the Pentateuch; but that a later editor (the Jehovist), or several successive editors, enlarged it to its present extent, sometimes very greatly, by the insertion of additional matter from other sources, whether these had appeared in a written form already, or whether they were still floating in the minds of the people as traditions. The book of Joshua is now generally regarded as in its character belonging to and completing the Pentateuch. De Wette was the first to concern himself (early in the last century) with the historical apart from the literary criticism of the Pentateuch, and refused to find anything in it but legend and poetry. The discussions on these points, which until recently were mainly led by German theologians, have latterly been taken up by English biblical critics, among the earliest being Dr. Davidson and Bishop Colenso.

Among those critics of the present day who deny the Mosaic authorship of the Pentateuch there is a tendency to recognize three elements or component parts welded together in the whole work (including Joshua). One of these is the fundamental or Elohistic document, which is partly historic in its matter but mainly legal, embracing Leviticus and parts of Exodus and Numbers. Another element consists of the Jehovistic, which is almost entirely narrative and historical, and to which belongs the history of the patriarchs, etc. The third component element is Deuteronomy, the second giving of the law, as the name signifies. The respective antiquity of the several portions has been much disputed, many critics making the Elohistic the earliest, the Jehovistic second, Deuteronomy last. Some modern critics, however, put the Elohistic section last, believing it to have been drawn up during the exile and published by Ezra after the return; while the Jehovistic section is assigned to the age of the early kings, and Deuteronomy to the reign of Josiah.

Pentecost (pen'te-kost: from the Greek *pentēkostē*, the fiftieth), a Jewish festival, held on the fiftieth day after the passover, in celebration of the ingathering and in thanksgiving for the harvest. It was also called the *Feast of Weeks*, because it was celebrated seven weeks after the passover. It is also a festival of the Christian church, occurring fifty days after Easter, in commemoration of the descent of the Holy Ghost on the disciples, called in England *Whitsuntide*.

Penthesilea (pen-the-sil-ē'a), in Greek mythology, a queen of the Amazons (which see).

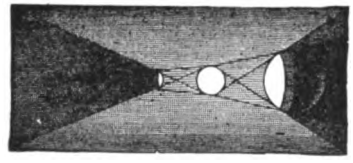
Penthièvre (pāṅ-tyâvr), an ancient county of Brittany, now forming the French department of Mor-

bihan. It belonged in earlier times to several branches of the house of Brittany, but at a later period came to the houses of Brosse and Luxembourg, and in 1569 was erected in their favor by Charles IX into a dukedom. It afterwards fell to the crown, and was given, in 1697, by Louis XIV to one of his illegitimate sons by Madame de Montespan, the Count of Toulouse, who died in 1737. His only son and heir was Louis Jean Marie de Bourbon, duke of Penthièvre, born in 1725; died in 1793; served as general at Dettingen and Fontenoy, and was father-in-law to King Louis Philippe.

Pentland Firth (pent'land), a channel separating the mainland of Scotland from the Orkney Islands, and connecting the North Sea with the Atlantic Ocean. It is about 17 miles long east to west, and 6 to 8 miles broad. A current, setting from east to west, flows through it with a velocity of 3 to 9 miles an hour, causing many eddies, and rendering its navigation difficult and dangerous.

Pentland Hills, a range of Scotland, in the counties of Edinburgh, Peebles, and Lanark, commencing 4½ miles south by west of Edinburgh, and extending southwest for about 16 miles. The highest summit, Scald Law, is 1898 feet above sea-level.

Penumbra (pen-um'bra), the partial shadow between the full light and the total shadow caused by an opaque body intercepting the light from a luminous body, the penumbra being the result of rays emitted by part



Umbra and Penumbra.

of the luminous body. An eye placed in the penumbra would see part of the luminous body, part being eclipsed by the opaque body; an eye placed in the 'umbra,' or place of total shadow, would receive no rays from the luminous body; an eye placed anywhere else than in the penumbra and umbra sees the luminous body without eclipse. The subject is of importance in the consideration of eclipses. In a partial eclipse of the sun, as long as any part of the same is visible the parties observing are in the *penumbra;* when the eclipse is total, in the *umbra.* The cut shows the phenomena of the umbra and penumbra in the case of a luminous body between two opaque bodies, the one larger, the other smaller than itself. See also *Eclipse.*

Penza (pān'za), a government of Russia, bounded by Nijni-Novgorod, Tambov, Saratov, and Simbirsk; area, 14,996 square miles; pop. 1,491,215. Its surface, though generally flat, is intersected by some low hills separating the basins of the Don and Volga. About 60 per cent. of the soil is arable, the chief crops being rye, oats, buckwheat, hemp, potatoes, and beet-root, and about 14 per cent. is under meadows or grazing land. The forests are extensive. The chief exports are corn, spirits, timber, metals, and oils.— PENZA, the capital, is on an eminence at the junction of the Penza and Sura, 440 miles southeast of Moscow. It was founded in 1666 as a defense against Tartar incursions, is mostly built of wood, has a cathedral, several other churches, a theater, etc. Pop. 76,552.

Penzance (pen'zans), a municipal borough and seaport of England, in the county of Cornwall, picturesquely situated on the northwest of Mount's Bay, 26 miles southwest of Truro. The harbor has accommodation for large vessels, and there is a considerable export of tin and copper, china-clay, and pilchards. The pilchard and other fisheries employ many persons. Penzance has a fine climate and pleasant environs, and is becoming a favorite watering-place. Pop. 13,136.

Peony (pē'u-ni; *Pæonia*), a genus of plants belonging to the natural order Ranunculaceæ, and very generally cultivated in gardens for the sake of their large showy flowers. The species are mostly herbaceous, having perennial tuberous roots and large deeply-lobed leaves. The flowers are solitary, and of a variety of colors, crimson, purplish, pink, yellow, and white. The flowers, however, have no smell, or not an agreeable one, except in the case of a shrubby species, *P. Moutan,* a native of China, of which several varieties, with beautiful whitish flowers stained with pink, are cultivated in gardens. The roots and seeds of all the species are emetic and cathartic in moderate doses. *P. officinālis* or *festiva,* the common peony of cottage gardens, was formerly in great repute as a medicine.

People's Palace, a building in the East End of London, situated in Mile-end Road, opened by Queen Victoria, May, 1887. It pro-

vides for the population of the East End a hall for concerts, entertainments, etc., a library and reading-rooms, gymnasia, swimming-baths, social-meeting rooms, rooms for games, refreshment rooms, a winter-garden, technical schools, etc. The nucleus of the palace was the Beaumont Institute, founded by Mr. J. T. B. Beaumont (died 1840), who left £12,500 to establish an institution for the moral and intellectual improvement of the working classes in the East End of London. A movement set on foot by a novel by Mr. Walter Besant — *All Sorts and Conditions of Men* — resulted in raising the fund to £75,000, and the establishment of the People's Palace.

People's Party, or POPULIST PARTY, a political party of the United States which held its first national convention in 1892. Its platform demanded a legal tender currency issued directly by the government, not through the medium of banks; free coinage of gold and silver at a ratio of 16 to 1; a graduated income tax; government ownership and operation of railroads, telegraphs and telephones; that land should not be monopolized by aliens, and that railroad lands should be reclaimed and held for settlers. This party had been preceded by the 'Farmers' Alliance,' holding similar views. It nominated candidates for President and Vice-President in 1892 and in 1896, and in 1900 endorsed the Democratic nomination of William J. Bryan. It nominated candidates also in 1904 and 1908, but its vote greatly fell off, becoming insignificant in the latter year.

Peoria (pē-ō'ri-a), a city, county seat of Peoria Co., Illinois, on the Illinois River (here called from its width Peoria Lake), 160 miles s. w. of Chicago. It is an important manufacturing city and railway center, with 17 steam and electric railroads; steamer connection with St. Louis by Illinois River, with Chicago by the Michigan Canal. It has large grain traffic, especially in corn and oats; also extensively engaged in pork packing. It has 600 manufacturing plants, with implements and tractors its leading interest, and steel and foundry products second. It has large paper mills, stove works, textile plants, brass and aluminum works, and many other industries. Bradley College is here. Pop. (1910) 66,950; (1920) 76,121.

Peperino (pep-ēr-ē'nō), the Italian name for a volcanic rock composed of sand, scoriæ, cinders, etc., cemented together. It is so named from the small peppercorn-like fragments of which it is composed. The Tarpeian Rock in Rome is composed of red peperino, and the catacombs are the hollows of old quarries dug in it.

Pepin (pep'in), the name of two distinguished Frank rulers of the 8th century, under the last kings of the Merovingian dynasty.— 1. PEPIN OF HERISTAL, major-domo at the court of Dagobert II, was, after the death of the king, appointed Duke of the Franks, and under a feeble regency ruled the kingdom with almost despotic sway. Charles Martel was his natural son.— 2. PEPIN LE BREF, son of Charles Martel, was, by agreement with the pope, proclaimed King of the Franks in 752, after the deposition of Childeric III. He defeated the Longobards in Italy, and made the Holy See a present of the lands which he conquered from them — the origin of the temporal power of the popes. He became the founder of the Carlovingian dynasty, being succeeded at his death in 768 by his son, Charles the Great, usually called Charlemagne.

Pepper (pep'er; *Piper*), a genus of plants, the type of the natural order Piperaceæ. The *Piper nigrum*, which furnishes the black pepper of commerce, is a native of the East Indies, where it is cultivated on an extensive scale. It is a climbing plant, with broad, ovate, acuminate leaves, and little globular berries, which, when ripe, are of a bright-red color. The pepper of Malacca, Java, and especially of Sumatra, is the most esteemed. Its culture has been introduced into various other tropical countries. White pepper is the best and soundest of the berries, gathered when fully ripe, and deprived of their external skin. The *Chavica Betle*, or betel, belongs to the same natural order. Cayenne pepper, Guinea pepper, bird pepper, etc., are the produce of species of *Capsicum*, natural order Solanaceæ. Jamaica pepper is pimento or allspice.

Black Pepper (*Piper nigrum*).

Pepper, WILLIAM, physician, born at Philadelphia in 1843, son of a distinguished physician of the same name. He graduated in medicine at the University of Pennsylvania, became a professor there in 1876, and was made

Provost of the University in 1880, resigning in 1894. He was very active in extending the scope and adding to the endowment of the University, which owes its present high standing largely to him. He was also actively connected with the Public Library of Philadelphia, the Commercial Museums, and other institutions. He died in 1898.

Peppercorn Rent, a nominal rent to be paid on demand. A nominal rent of one peppercorn a year is an expedient for securing acknowledgment of tenancy in cases where houses or lands are let virtually free of rent.

Peppermint. See *Mint.*

Peppermint-tree, the *Eucalyptus piperita*, a native of New South Wales.

Pepper-pot, a much-esteemed West Indian dish, the principal ingredient of which is cassareep (which see), with flesh of dried fish and vegetables, chiefly the unripe pods of the ochra, and chillies.

Pepper-root, a herbaceous plant of the nat. order Cruciferæ, a native of the United States, so called from the pungent, mustard-like taste of its root, which is used as a condiment.

Pepperwort, a plant of the genus *Lepidium*, one species of which (*L. sativum*), the common garden cress, is cultivated for the table. See also *Dentaria.*

Pepsine (pep'sin), an active principle of the gastric juice, a peculiar animal principle secreted by the stomach. The pepsine or pepsia of pharmacy is a preparation of the mucous lining of the stomach of the pig or calf. It is often prescribed in cases of indigestion connected with loss of power and tone of the stomach.

Pepys (peps or pep'is), SAMUEL, secretary to the admiralty in the reigns of Charles II and James II, was born at Brampton, Huntingdonshire, in 1632, and educated at Cambridge. He early acquired the patronage of Sir Edward Montagu, afterwards Earl of Sandwich, who employed him as secretary in the expedition for bringing Charles II from Holland. On his return he was appointed one of the principal officers of the navy. In 1673, when the king took the admiralty into his own hands, Pepys was appointed secretary to that office, and performed his duties with great credit. During the excitement of the Popish Plot he was committed to the Tower, but was after some time discharged without a trial, and reinstated in his office at the admiralty, which he held until the abdication of James II. He died in 1703. He was president of the Royal Society for two years; but his title to fame rests upon his *Diary* (1659–69), which is a most entertaining work, revealing the writer's own character very plainly, giving an excellent picture of contemporary life, and of great value for the history of the court of Charles II. It is in shorthand, and was discovered among a collection of books, prints, and manuscripts bequeathed by Pepys to Magdalene College, Cambridge; first printed in 1825.

Pequots, a tribe of American Indians, a branch of the Mohegans, residing near the Thames River, in Connecticut. Strong and warlike, they opposed the settlement of the English in Connecticut. Hostilities broke out in 1637, the Indian town was burned, and the tribe practically annihilated.

Pera (pā'ra), a suburb of Constantinople (which see).

Peræa (pe-rē'a), a district of Palestine eastward of the Jordan, the 'Gilead' of the Old Testament.

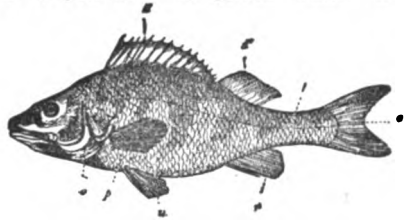
Perak (pā'rak), a native state of the Malay Peninsula, extending about 80 miles along the west coast, and stretching inward to the mountain range which forms the backbone of the peninsula; area, 7949 sq. m., pop. 329,665. Since 1875 Perak has been practically a dependency of the Straits Settlements (which see), the native rajah being controlled by a British resident appointed by the governor of that colony, and English officers holding many posts under the native government. Perak is a flourishing and progressive country. Roads and railways are constructed or being made and its rich resources developed. Tin is produced in large quantities, and tapioca, pepper, rice, sugar, coffee, cacao, and cinchona are successfully cultivated. The chief town is Thaipeng, but the headquarters of the British resident are at Kwala Kangsa.

Perception (pur-sep'shun), in philosophy, the faculty of perceiving; the faculty by which we have knowledge through the medium or instrumentality of the bodily organs, or by which we hold communication with the external world. Perception takes cognizance only of objects without the mind. We *perceive* a man, a horse, a tree; when we think or feel, we are *conscious* of our thoughts and emotions. Two great disputes are connected with perception, both brought into full prominence by Bishop Berkeley. The first is the origin of our judgments of the distances and real mag-

nitudes of visible bodies. The second question has reference to the grounds we have for asserting the existence of an external material world, which, according to Berkeley, was connected with the other. See *Idealism.*

Perceval (pèr'se-val), SPENCER, an English statesman, son of John Perceval, Earl of Egmont, born in 1762; received his education at Harrow and Trinity College, Cambridge. On quitting the university he studied law. In 1801 he became solicitor-general, and in 1802 attorney-general. In 1807 he was appointed chancellor of the exchequer, and on the death of the Duke of Portland, in 1809, he became premier. In this post he continued till May 11, 1812, when a person named Bellingham shot him dead in the lobby of the House of Commons. Perceval was a keen debater and a fluent and graceful speaker, but was shallow and intolerant, and unequal to the task of leading the councils of a great nation.

Perch, a genus of acanthopterous fishes, forming the type of the perch family (Percidæ). The common perch (*Perca fluviatilis*) is a common tenant of fresh-water lakes and rivers. The body is broad, and somewhat flattened laterally. There are two dorsal fins, the anterior supported by very strong spines. It is colored a greenish-brown on the upper parts, the belly being of a yellowish or golden white. The



The common Perch (*Percha fluviatilis*). *o*, Gill-cover, with the gill-slit behind it; *p*, One of the pectoral fins, the left; *v*, The left ventral fin; *d*, The first dorsal fin; *d'*, The second dorsal fin; *c*, The caudal fin or tail; *a*, The anal fin; *l*, Lateral line.

sides are marked with from five to seven blackish bands. The average weight is from 2 to 3 lbs. The perch is a voracious feeder, devouring smaller fishes, worms, etc. The American yellow perch is one of the most common and beautiful of the fresh-water fishes of the United States. The *Serränus cobrilla* and *S. gigas* (giant perch) are also sometimes termed 'sea-perches.' For the climbing-perch of India see *Climbing-perch.*

Perch, as a measure of length, see *Pole.*

Perchers, or PERCHING BIRDS. See *Insessores.*

Perchloric Acid (per-klō'rik; $H Cl O_4$) is prepared by the action of strong sulphuric acid upon potassium perchlorate. It is a colorless, sirupy liquid, resembling sulphuric acid. Brought into contact with organic matter it is instantly decomposed, often with explosive violence. The perchlorates have the general formula $MClO_4$, where M represents a monovalent metal, such as potassium or sodium.

Per'cidæ. See *Perch.*

Percussion (per-kush'un), in medicine, that method of diagnosis which consists in striking gently on the surface of one of the cavities of the body, and then endeavoring to ascertain from the sound produced the condition of the organ lying beneath. Percussion is most frequently used on the chest, but it is also occasionally applied to the cavity of the abdomen, the head, etc.

Percussion Caps are small copper cylinders, closed at one end for conveniently holding the detonating composition which is exploded by percussion, so as to ignite the powder in certain kinds of firearms. The copper cap came into general use between 1820 and 1830.

Percy (per'si), the name of a noble family who came to England with William the Conqueror, and whose head, WILLIAM DE PERCY, obtained thirty knights' fees in the north of England. A descendant, also named WILLIAM, who lived in the early part of the 12th century, left behind him two daughters, the elder of whom died childless, and the younger, Agnes, married Josceline of Lorain, brother-in-law of Henry I, who assumed the surname of his bride. His son, RICHARD DE PERCY, was one of the twenty-five barons who extorted Magna Charta from King John. His great-grandson, HENRY, LORD PERCY, was created Earl of Northumberland in 1337. He was Marshal of England at the coronation of Richard II, against whom, however, he took up arms, and succeeded in placing the crown on the head of the Lancastrian aspirant, Henry IV. He took up arms against this king also, but his forces were beaten at Shrewsbury (1403), where his son, Henry Percy (Hotspur), fell; and again at Barnham Moor (1407–8), where he himself fell. His titles were forfeited, but were revived in favor of his grand-

son HENRY, who was appointed lord high constable of England, and who fell fighting in the Lancastrian cause at St. Albans (1453). For the same cause his son and successor shared the same fate at Towton (1461). The fourth earl was murdered during a popular rising, caused by his enforcing a subsidy ordered by the avaricious Henry VII. The sixth and seventh earls fell by the hands of the executioner in the reigns of Edward VI and Elizabeth respectively. The eighth died a violent death in the Tower, where he was confined on a charge of taking part in a plot in favor of Mary of Scotland. ALGERNON, the tenth earl, took part in the civil war against Charles I, and afterwards used all his influence to bring about the Restoration. JOSCELINE, the eleventh earl, died without male issue; his only daughter married Charles, duke of Somerset, and became the mother of ALGERNON, DUKE OF SOMERSET, who was created Earl of Northumberland, with remainder to his son-in-law, SIR HUGH SMITHSON, a Yorkshire baronet of good family. The latter succeeded to the earldom in 1750, assuming the name of Percy, and in 1766 received the ducal title. The present duke thus represents the female line of the ancient historical house.

Percy, THOMAS, Bishop of Dromore, in Ireland, was born at Bridgenorth in 1728, and graduated at Christ Church, Oxford, in 1753. He held several livings, in 1769 was appointed chaplain to the king, and in 1778 raised to the deanery of Carlisle, which he resigned four years after for the Irish bishopric of Dromore. He died at Dromore in 1811. The most popular of his works are his *Religues of Ancient English Poetry*, based on an old manuscript collection of poetry, but much modernized in style. The work was published in 1765, and materially helped to give a more natural and vigorous tone to English literature, then deeply tainted with conventionalism.

Perdix (per'diks), the generic name of the true partridges. The common partridge is *P. cinereus.*

Peregrine Falcon. See *Falcon.*

Perekop (pā-rā-kop'), a town of Southern Russia, government of Taurida, 85 miles N.N.W. of Simferopol, on the Isthmus of Perekop, formerly a place of some military importance. The isthmus, about 20 miles long, by 4 miles wide where narrowest, connects the Peninsula of the Crimea with the mainland, and separates the Sea of Azov from the Black Sea.

Père-la-Chaise (pār-lâ-shāz), a famous cemetery to the northeast of Paris, opened in 1804. It occupies ground a part of which was granted to Père de la Chaise, or Chaize, confessor of Louis XIV. Its present extent is 212 acres, and it contains the burial-places of great numbers of eminent Frenchmen.

Perennial (pe-ren'i-al), in botany, a term applied to those plants whose roots subsist for a number of years, whether they retain their leaves in winter or not. Those which retain their leaves are called *evergreens;* such as cast their leaves are called *deciduous.* Perennial herbaceous plants, like trees and shrubs, produce flowers and fruit year after year.

Perennibranchiata (per-en-i-bran-ki-ā'ta), a section of the amphibian order Urodela, in which the branchiæ or gills of early life persist throughout the entire existence of the animal, instead of disappearing when the lungs are developed. Examples are seen in the Proteus, Siren, and Axolotl. See *Amphibia.*

Pereyaslavl (pā-rā-yas'lavl), an old town of Southern Russia, government of Poltava, 175 miles W.N.W. of Poltava. Pop. 14,609.

Pereyaslavl-Zalyesskii, an old town of Central Russia, government of Vladimir, 87 miles northeast of Moscow. It has extensive cotton manufactures. Pop. 8662.

Perfectionists (per-fec'shun-ists), or BIBLE COMMUNISTS, popularly named FREE-LOVERS, an American sect founded in 1838 by John Humphrey Noyes. Noyes was employed as a law-clerk at Putney, in Vermont, when the fierce religious revival of 1831 spread over the New England States, but he abandoned law for religion, and took upon himself the restoration of the primitive Christian ideal. All property was thrown into a common stock; all debts, all duties fell upon the society, which ate in one room, slept under one roof, and lived upon one common store. A complex marriage system was introduced, and the laws of the land were rejected save when they were in consonance with the believers' ideas. The community was broken up in 1847, the remaining members moving to Oneida, N. Y., where marriage and family life were introduced; communism of property gave way to joint-stock, and the society was legally incorporated as the Oneida Community, Limited. Besides owning much real estate the company now has extensive manufacturing interests.